SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[*The* MINING JOURNAL *is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.*]

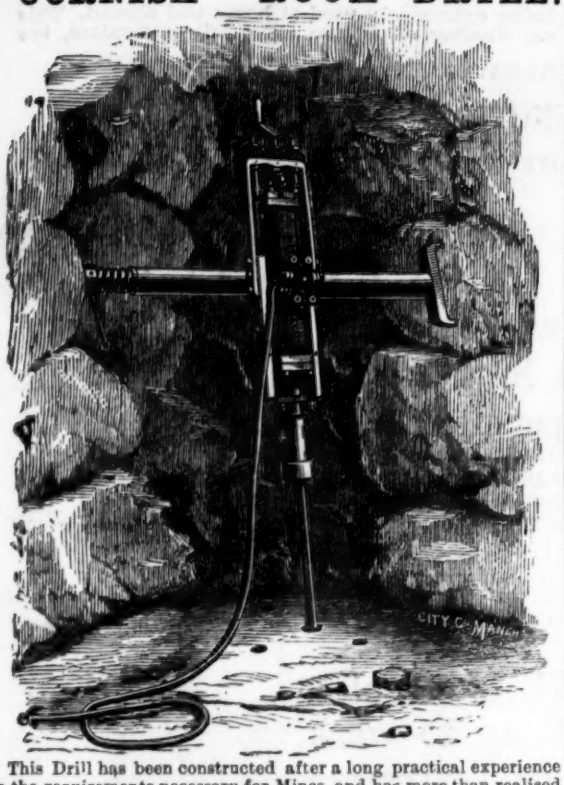
No. 2541.—VOL. LIV. LONDON, SATURDAY, MAY 3, 1884. PRICE (WITH THE JOURNAL) SIXPENCE BY POST £1 4s. PER ANNUM.

FIRST SILVER MEDAL, ROYAL CORNWALL POLYTECHNIC —Highest Award for Effectiveness in Boring, and Economy in the Consumption of Air

JUBILEE EXHIBITION, 1882.

THE PATENT

"CORNISH" ROCK DRILL.



This Drill has been constructed after a long practical experience in the requirements necessary for Mines, and has more than realised the expectations of its inventors. The chief objects in view were GREATER DURABILITY AND LESS LIABILITY TO DISARRANGEMENT; but it has also proved itself more EFFECTIVE AND ECONOMICAL.

We are now prepared to enter into any reasonable arrangement so as to enable users to judge of its merits, as we are thoroughly convinced that we can offer the BEST ROCK DRILL IN THE MARKET.

Further particulars on application to the Makers—

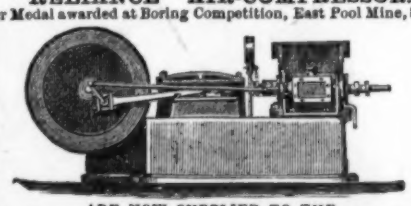
HOLMAN BROTHERS,
CAMBORNE FOUNDRY AND ENGINE WORKS,
CAMBORNE, CORNWALL.

THE PATENT

"ECLIPSE" ROCK-DRILL AND "RELIANCE AIR-COMPRESSOR."

First Silver Medal awarded at Boring Competition, East Pool Mine, Sept. 1883.

PRIZE MEDAL, HIGHEST AWARD.



PARIS EXHIBITION. 1878.

ARE NOW SUPPLIED TO THE
ENGLISH, FOREIGN, AND COLONIAL GOVERNMENTS
And are also in use in a number of the
LARGEST MINES. RAILWAYS, QUARRIES, AND HARBOUR WORKS IN GREAT BRITAIN AND ABROAD

FOR ILLUSTRATED CATALOGUE AND PRICES, apply to—
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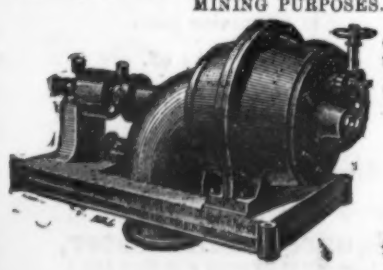
WATER POWER,

UTILISED WITH THE GREATEST ECONOMY AND EFFECT BY THE PATENT "TRENT" TURBINE.

As arranged, with a horizontal spindle, it is specially adapted for MINING PURPOSES.



Catalogues on application to the sole British Maker,

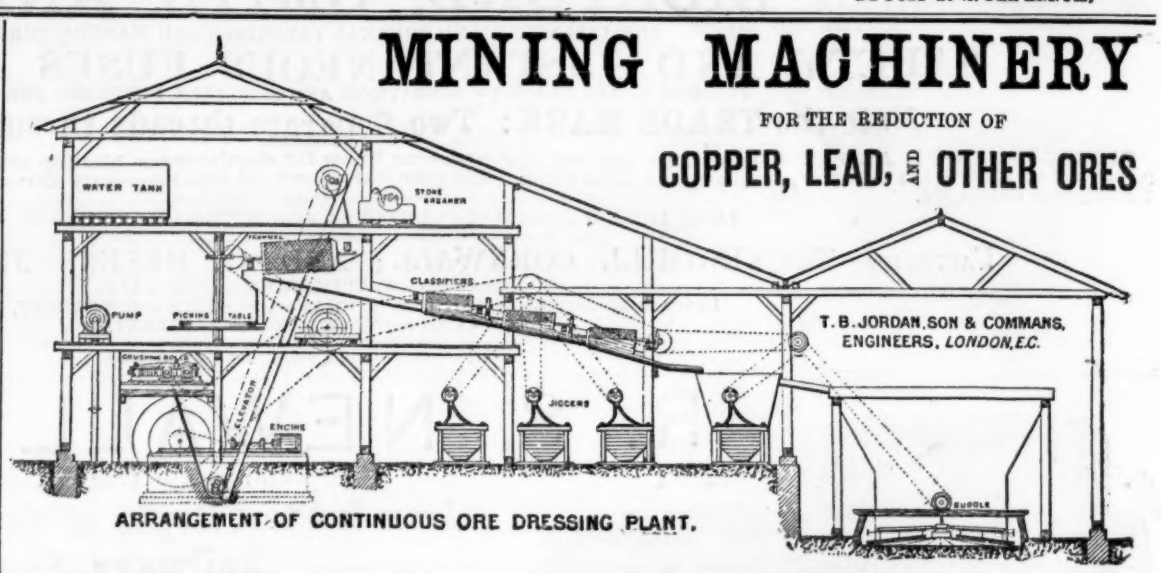
C. L. HETT,
ANCHOLME FOUNDRY,
BRIGG,
ENGLAND.

The Patent Trent, New American Hercules, & Victor Turbines.

MINING MACHINERY

FOR THE REDUCTION OF

COPPER, LEAD, AND OTHER ORES



ARRANGEMENT OF CONTINUOUS ORE DRESSING PLANT.

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PATENT

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MEDAL AND HIGHEST AWARDS.

1872—American Institute.
1873—Ditto.
1874 — London International.
1875—Manchester.
1875—Leeds.
1875—Cornwall.
1875—Rio de Janeiro.
1876—Australia.
1876—Philadelphia.
1877—Cornwall.
1877—Mining Institute.
1878—Paris.

We claim 40 per cent. greater effective drilling power.

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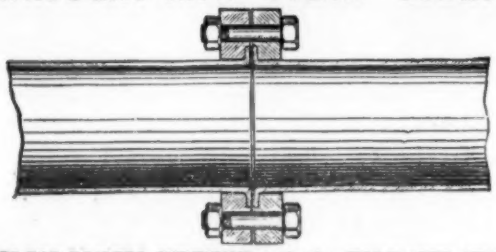

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For Catalogues of Rock Drills, Air Compressors, Steel or Iron Steam Tubes. Boiler Tubes, Perkins's Tubes, Pneumatic Tubes, Boring Tubes, and all kinds of Machinery and Mining Plant, apply to—

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THE

"Barrow" Rock Drill

COMPANY.

HOSKING AND BLACKWELL'S PATENT.

SUPPLY their CELEBRATED ROCK DRILLS, AIR COMPRESSORS, &c., and all NECESSARY APPLIANCES for working the said Drills.

The DRILLS are exceedingly STRONG, LIGHT, SIMPLE, and adapted for ends stopes, quarries, and the sinking of shafts. They can be worked by any miner

Their DRILLS have most satisfactorily stood the TEST of LONG and CONTINUOUS WORK in the HARDEST KNOWN ROCK in numerous mines in Great Britain and other countries clearly proving their DURABILITY and POWER.

About 200 are now at work driving from three to six times the speed of hand labour, and at from 20 to 30 per cent. less cost per fathom. They can be worked by any miner.

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THE PATENT

"Cranston" Rock Drill,

AIR COMPRESSOR, AND DEEP BORING MACHINERY.

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J. G. CRANSTON,
22, GREY STREET NEWCASTLE ON-TYNE.

FIRST AWARD.
SYDNEY. 1879.

BICKFORD'S PATENT FUSES

FIRST AWARD
MELBOURNE, 1881.

SILVER MEDAL OF THE MINING INSTITUTE OF CORNWALL, TRURO, 1880,
for an Improved Method of Simultaneous Blasting.

FOR SIMULTANEOUS BLASTING.

BICKFORD, SMITH AND CO.,

THE INVENTORS, AND ORIGINAL PATENTEES AND MANUFACTURERS OF

SAFETY AND INSTANTANEOUS FUSES AND IGNITERS

FOR USE IN ALL BLASTING OPERATIONS AND SPECIALLY PREPARED FOR ANY CLIMATE

Note the TRADE MARK: Two Separate threads through centre of Fuse.

BICKFORD, SMITH AND CO.'S Patent Igniters and Instantaneous Fuses for simultaneous blasting are being extensively used at home and abroad. This improved method is the cheapest, simplest, and most dependable ever introduced for simultaneously firing any number of charges. For full particulars, see Descriptive Catalogue.

PRICE LISTS, DESCRIPTIVE CATALOGUES, AND SAMPLES TO BE HAD ON APPLICATION.

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HEAD OFFICE—TUCKINGMILL, CORNWALL.
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Every package bears Bickford, Smith, and Co.'s copyright label.

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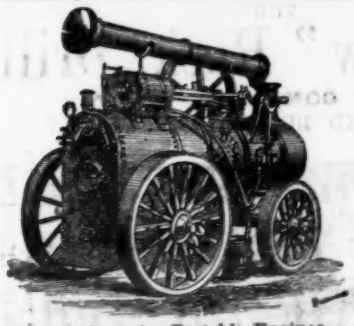

Robey's Superior Portable Engines, 4 to 50-h.p.

LONDON OFFICES:—
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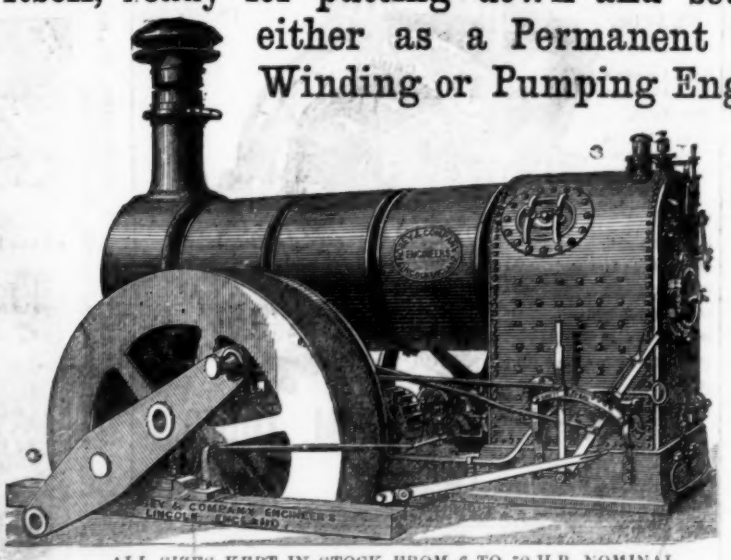
The PATENT "ROBEY" MINING ENGINE is complete in itself, ready for putting down and setting to work, either as a Permanent or Temporary Winding or Pumping Engine.



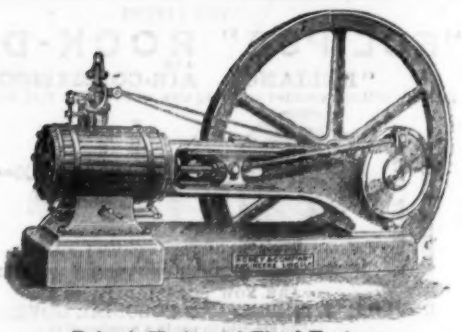
ALL SIZES KEPT IN STOCK FROM 6 TO 50-H.P. NOMINAL.

Robey's Vertical Stationary Steam Engine, 1½ to 16-h.p.

The Improved Robey Fixed Engine and Locomotive Boiler Combined, 4 to 65-h.p.

Please note this is the Original "ROBEY" Engine as designed and manufactured by Messrs. ROBEY and Co., of Lincoln. All others are mere attempts at imitation.

For particulars and prices apply to the Patentees and Sole Manufacturers—



Robey's Horizontal Fixed Engines, 4 to 60-h.p.

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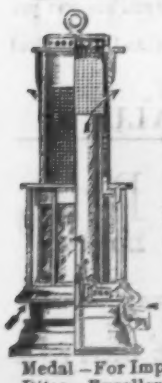

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SAFETY LAMP AND **GAUZE MANUFACTORY,**

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MIDLAND DAVY LAMP WORKS,
Belmont Passage, 203, Lawley-street,
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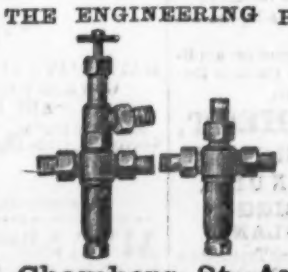
Makers of Williamson's Double Safety Lamp,
Williamson's Patent Double Safety Lamp shown half in section.

Medal—For Improved Invention—London, Kensington, 1874.
Ditto—Excellence of Workmanship—Wrexham, 1867.

BORLAND'S PATENT INJECTOR.

SEE THE ENGINEERING PAPERS.

The cheapest and most economical.
Can be cleaned in a few minutes.
All parts made to gauge.
Made entirely of best gun metal.
Is the smallest and neatest.



Has no moving parts.
Will not shake off.
Has the most rapid delivery.
No joints to make.
Prompt and continuous action guaranteed.

S. BORLAND, Mansfield Chambers, St. Ann's Square, Manchester,
(Late Manager for Sharp, Stewart and Company, Limited, Atlas Works, Manchester. Upwards of 22 years with that firm.)
Price Lists Particulars, References, &c., on Application.

R. HUDSON'S

Patent Steel Trucks, Points and Crossings,

PORTABLE RAILWAY, STEEL BUCKETS, &c., &c.

Telephone No. 14.
In connection with the Leeds Exchange, and all the principal Hotels and places of business in the town.

GILDERSOME FOUNDRY, NEAR LEEDS.

(Near Gildersome Station, G.N.R. Main Line, Bradford to Wakefield and London, via Laisterdyke and Ardsley Junctions.)

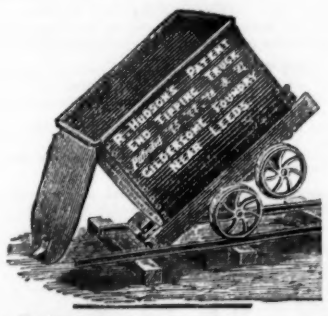
Registered Telegraphic Address:—"GILDERSOME, LEEDS."
A. B. C. Code used.

UPWARDS of 25,000 of these Trucks and Wagons have been supplied to the South African Diamond Mines; American, Spanish, Indian, and Welsh Gold, Silver, Copper, and Lead Mines; Indian and Brazilian Railways, and to Railway Contractors, Chemical Works, Brick Works, and Coal and Mineral Shippers, &c., &c., and can be made to lift off the underwork, to let down into the hold of a vessel, and easily replaced. They are also largely used in the Coal and other Mines in this country, and are the LIGHTEST, STRONGEST, and most CAPACIOUS made, infinitely stronger and lighter than wooden ones, and are all fitted with R. H.'s Patent "Rim" round top of wagons, requiring no rivets, and giving immense strength and rigidity. End and body plates are also joined on R. H.'s patent method, dispensing with angle-irons or corner plates.

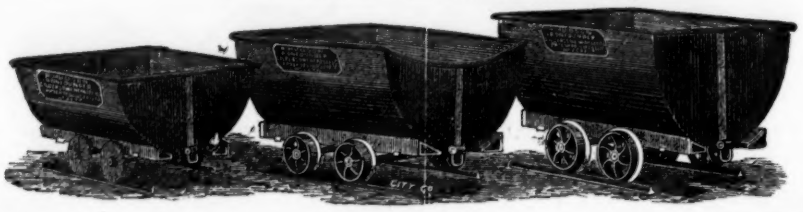
Patented in Europe, America, Australia, India, and British South Africa, 1875, 1877, 1878, 1881, and 1883.
N.B:—The American, Australian, Indian, and Spanish Patents on Sale.

CAN BE MADE TO ANY SIZE, AND TO ANY GAUGE OF RAILS.

1.—PATENT STEEL END TIP WAGONS.

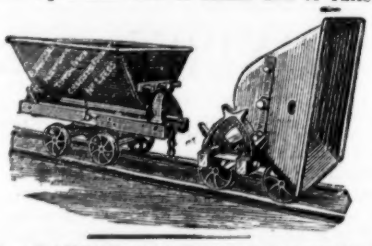


7.—PATENT STEEL MINING WAGONS.

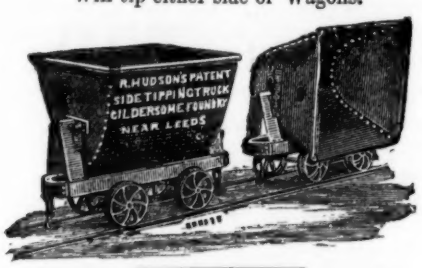


12.—PATENT STEEL HOPPER WAGON, WITH BOTTOM DOORS.

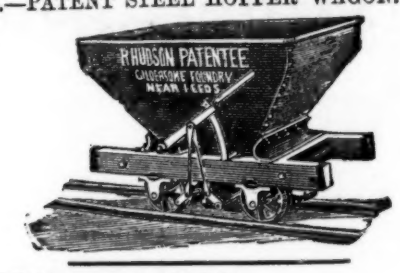
2. PATENT UNIVERSAL TRIPLE-CENTRE STEEL TIPPING TRUCK,
Will tip either SIDE or either END of rails.



8.– PATENT DOUBLE-CENTRE STEEL SIDE TIP WAGONS,
Will tip either side of Wagons.

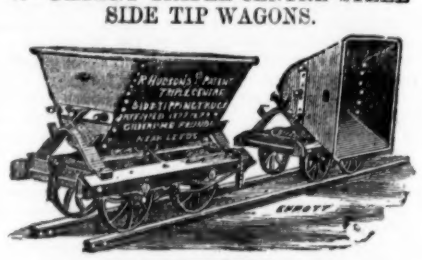


13.—PATENT STEEL HOPPER WAGON.

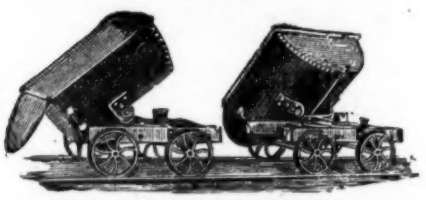


One man can EASILY tip ANY WEIGHT in these wagons.

3.—PATENT TRIPLE-CENTRE STEEL SIDE TIP WAGONS.

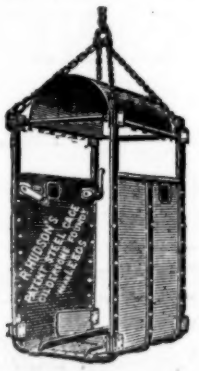


9.—PATENT STEEL ALL-ROUND TIP WAGON.



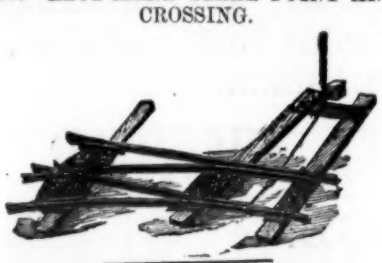
14.—SELF-RIGHTING STEEL TIP BUCKET.
(The "CATCH" can also be made SELF ACTING if desired.)

15.—STEEL CAGE.



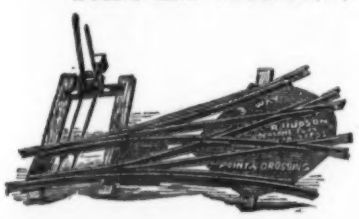
4. –PATENT STEEL PLATFORM OR SUGAR CANE WAGON.

10.—LEFT-HAND STEEL POINT AND CROSSING.



5.—PATENT STEEL CASK.
As supplied to H.M. War Office for the late war in Egypt).
DOUBLE the STRENGTH of ordinary Casks without any INCREASE in weight.
(Made from 10 gals. capacity UPWARDS to any desired size.)

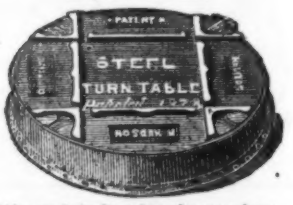
11.—RIGHT AND LEFT-HAND STEEL POINT AND CROSSING.



16.—PATENT STEEL WHEELBARROWS.
Made to any Size.
Lightest and Strongest in the Market.

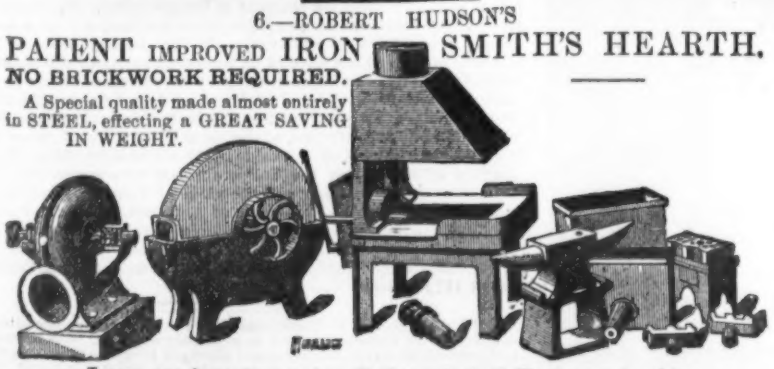
A great success.

17.—STEEL SELF-CONTAINED TURNTABLE.



(Also made in CAST Iron for use where weight is not a consideration.

6.—ROBERT HUDSON'S
PATENT IMPROVED IRON SMITH'S HEARTH,
NO BRICKWORK REQUIRED.
A Special quality made almost entirely in STEEL, effecting a GREAT SAVING IN WEIGHT.



Large numbers in use by all the principal Engineers in this country and abroad.

18.—"AERIAL" STEEL WINDING TUB.

Largely employed in the South African Diamond Fields.

No. 19.—PATENT STEEL CHARGING BARROW,
DOUBLE the STRENGTH & much LIGHTER than ordinary Barrows

ALL KINDS OF BOLTS NUTS, AND RIVETS MADE TO ORDER ON THE PREMISES

BELL'S ASBESTOS.

BELL'S PATENT ASBESTOS BLOCK PACKING, for High Pressure Engines. This Packing has been specially designed to overcome the difficulties experienced by engineers and others in the practical working of engines of the most modern type of construction. The greatly increased skill and workmanship now obtained in the construction of engines and boilers have led to a rapid increase in the working pressure, the object being the attainment of a high rate of speed combined with economical working, the practical advantage of which, however, cannot be realised unless the Packings are so constructed as to avoid stoppages for the purpose of re-packing the stuffing boxes. It is now a recognised fact that the most perfect heat-resisting material suitable for the purpose of a Packing is Asbestos, but to ensure a successful application of this fibre, great skill is required in manufacture. In this Packing the Asbestos is woven into a stout cloth, and owing to the peculiar way in which it is manipulated, great elasticity is imparted to the Packing. This Packing has met with the most unqualified approval wherever it has been used, and on being taken out after about twelve months, working at 70 lb. pressure, it has been found to be in a perfect state of preservation, and was therefore replaced. The Patent Block Packing is square, as Fig. 1, and Figs. 2 and 3 represent the Round Block Packing with solid and hollow rubber core, and Fig. 4 without core, but with rubber inlaid. An Engineer writes as follows:—"The Asbestos Block Packing works splendidly. I have never seen its equal. We keep our gland nuts so that you can move them with finger and thumb, and can maintain a constant vacuum of 28½ in." As these packings are extensively imitated, and as it is a common practice among dealers and agents to supply the cheaper manufactures at my list prices, users are requested to see that the packing supplied to them bears my trade mark.

TRADE MARK.

The goods of this house are of the highest quality only, and no attempt is made to compete with other manufacturers by the supply of inferior materials at low prices. All orders must be sent direct to the undermentioned depôts and not through Agents or Factors.

BELL'S ASBESTOS BOILER PRESERVATIVE. This useful mixture by absorbing the free oxygen that is in the water entirely checks pitting and corrosion. It also disintegrates incrustation so immediately as to prevent its adhering to the plates. Not only is a great economy of fuel effected by keeping boilers clean, but the risk of having the plates burned is thereby obviated. It has been computed that 1/16 in. thick of incrustation causes a waste of 15 per cent. of coal; ¼ in., 60 per cent.; ½ in., 150 per cent. Thus the Preservative avoids the great risks which are inseparable from scaled plates, lengthens the life of a boiler and covers its own cost a hundred-fold by economy of fuel. It is entirely harmless, and has no injurious action on metals. It can be put into the feed tank or boiler, as may be most convenient. Sold in drums and casks bearing the Trade Mark, without which none is genuine.

BELL'S ASBESTOS YARN and SOAPSTONE PACKING

for Locomotives, and all Stationary Engines running at very high speed with intense friction.

The following Testimonial refers to this Packing:—

Festiniog Railway, Locomotive Superintendent's Office,
Portmadoc, January 13, 1883.

Mr. John Bell, 118, Southwark-street, S.E.

DEAR SIR,

I have much pleasure in saying that the Asbestos Yarn and Soapstone Packing gives every satisfaction; indeed, better than we expected. We have a locomotive packed with it, which has been running five months (and think of the piston speed with our small wheels). I think the Soapstone a great improvement, as it keeps the packing elastic, and prevents it getting hard. I am very pleased with its working, and also the very low price for such good lasting Packing. The Asbestos Yarn we find is very useful, and answers admirably.

Yours truly,
(Signed) W. WILLIAMS.

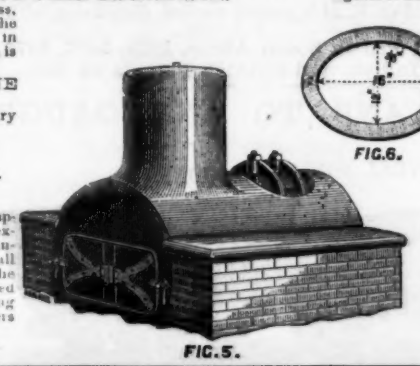


FIG. 5.

FIG. 6.

FIG. 1.

FIG. 2.

FIG. 4.

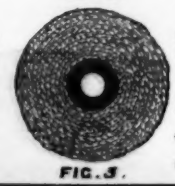


FIG. 3.

BELL'S ASBESTOS BOILER AND PIPE COVERING COMPOSITION, for coating every class of steam pipes and boilers, non-combustible and easily applied when steam is up; adheres to metals and preserves them from rust; prevents the unequal expansion and contraction of boilers exposed to weather; covers 50 per cent. more surface than any other coating, and is absolutely indestructible. It can be stripped off after many years' use, mixed up with 20 per cent. of fresh, and applied again. The composition is supplied dry, and is only to be mixed with water to the consistency required for use.

A Horizontal Boiler, 17 ft. 6 in. long, 15-H.P., gave the following results:—

Temperature on Plates - - - 186 deg.
" " Covering - - 94 deg.

One ton of coal was saved per week, and although the fire was raked out every evening, 20 lbs. of steam were found in the boiler next morning.

The following Testimonial refers to this Covering:—

Offices of the Wimbledon Local Board, Wimbledon,
Nov. 28th, 1883.

DEAR SIR,—It may interest you to know that we save exactly 46 per cent. in fuel through using your covering.—Yours truly, W. SANTO CRIMP, C.E., F.G.S.

BELL'S ASBESTOS and INDIA-RUBBER WOVEN TAPE and SHEETING, for making every class of Steam and Water Joints. It can be bent by hand to the form required, without puckering, and is especially useful in making joints of manhole and mudhole doors; also for large "still" joints where boiling fat and steam have to be resisted. It is kept in stock in rolls of 100 ft., from ⅛ in. (Fig. 6) to 3 in. wide, and any thickness from 1/16 in. upwards. Manhole covers can be lifted many times before the renewal of the jointing material is necessary. The same material is made up into sheets about 40 in. square, and each sheet bears the Trade Mark, without which none is genuine. It is very necessary to guard against imitations of this useful material, and to secure themselves against being supplied with these inferior articles at my price, users are recommended to see that every 10 ft. length of the Asbestos Tape purchased by them bears the Trade Mark.

BELL'S SPECIAL LONDON-MADE ASBESTOS MILLBOARD, for Dry Steam Joints, made of the best Asbestos fibre, is well-known for its toughness and purity, and is absolutely free from the injurious ingredients frequently used to attain an appearance of finish, regardless of the real utility of the material. Made in sheets measuring about 40 in. square, from 1-64th in. to 1 in., and ½ millimetre to 25 millimetres thick. Each sheet bears the Trade Mark.

BELL'S ASBESTOS EXPANSION SHEETING (PATENT).

This Sheeting is another combination of Asbestos with India-rubber, giving to the steam user the special advantages of both materials.

The India-rubber Washer is protected from the action of heat and grease by an outer coating of vulcanised Asbestos Cloth, thus producing an excellent joint where expansion and contraction render other materials unserviceable.

This material is admirably suited to steam pipe joints and every class of valve.

Valves made of this material are very durable, as they are not subject to injury by oil.

BELL'S "ASBESTOS LUBRICANT."

ILLUSTRATED PRICED CATALOGUE FREE ON APPLICATION TO

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OR THE DEPOTS—**118a, SOUTHWARK STREET, S.E.,**

Victoria Buildings, Deansgate, MANCHESTER. 11 and 13, St. Vincent Place, GLASGOW. 39, Mount Stuart Square, CARDIFF. 21, Ritter Strasse, BERLIN.

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CRUCIBLE STEEL CASTINGS

Of all descriptions of special strength and solidity.

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TITANIC CAST STEEL FOR BORERS,

And of R. Mushet's pecial Steel for Lathe and Planing Tools and Drills,

THE STEEL WHICH REQUIRES NO HARDENING.

CLYDE STEEL AND IRON WORKS, SHEFFIELD.

PUMPS FOR MINING USE.

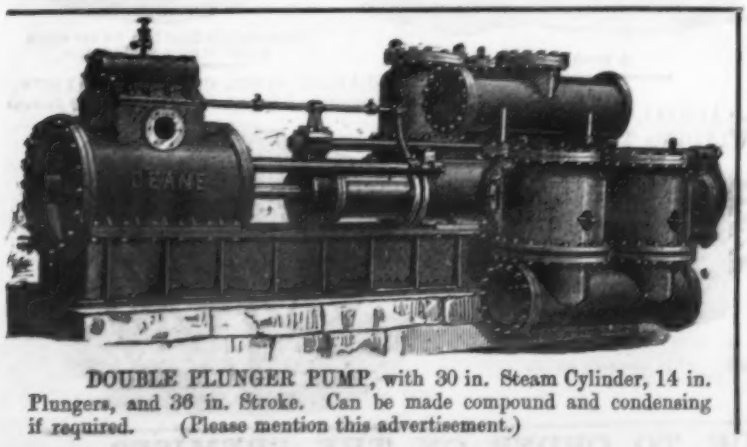
PULSOMETER ENGINEERING COMPANY, LIMITED,

NINE ELMS IRONWORKS, LONDON, S.W.

City Offices—61 and 63, QUEEN VICTORIA STREET, E.C.

EVERY MINING ENGINEER should have the company's profusely illustrated general catalogue, 140 pages, cloth, price 3s., in stamps of any country. Circulars free.

THE PULSOMETER is especially adapted to use underground as it will pass gritty water freely, having no moving parts except the simple valves. IT HAS NO EXHAUST, and will work suspended on a chain. It is suitable for lifts not over about 80 feet total. It is also most satisfactorily employed for coal washing purposes.



DOUBLE PLUNGER PUMP, with 30 in. Steam Cylinder, 14 in. Plungers, and 36 in. Stroke. Can be made compound and condensing if required. (Please mention this advertisement.)

VERTICAL STEAM PUMPS FOR SINKING.

LIGHT WROUGHT IRON FLANGE PIPE

STEAM HOSE.

PULSOMETER FOR COAL WASHING, SINKING, &c.

ON HIRE, WITH OPTION OF PURCHASE BY ARRANGEMENT.

PULSOMETER PUMP suspended on a chain.

FOREIGN MINING AND METALLURGY.

Attempts are being made to secure a higher range of prices in the French Iron Trade, but it is difficult to discover any change in the situation which is at all calculated to justify or support such proceedings. In the Longwy basin the stock of pig in hand remains considerable; it is composed of about 20,000 tons of refining and 60,000 tons of casting pig. In presence of these totals refining pig has been selling at 2*l.* 2s. 6d. to 2*l.* 4s. per ton in the case of transactions of any serious importance, while No. 3 casting pig has made 2*l.* 11s. 6d. to 2*l.* 12s. per ton. Casting pig has, for the rest, continued neglected, and nothing has occurred to induce hopes of an improvement for some time to come. The stock of refining pig has been declining in France of late, principally in consequence of the blowing out of a number of blast-furnaces. It should, however, be noted that two new furnaces are about to be lighted. The imports of iron minerals into France in the first three months of this year amounted to 349,528 tons, as compared with 378,863 tons in the corresponding period of 1883, and 327,550 tons in the corresponding period of 1882. The imports of Spanish iron minerals in the first quarter of this year were especially heavy. The condition of the German iron trade has not materially changed. The demand for pig has fallen off, but iron has continued in sufficient request to maintain a tolerable activity in affairs.

Transactions have continued restricted in the Belgian iron trade. In the Liége basin business has been sustained rather more firmly than in the Charleroi district, employment being more abundant, while transactions are carried through with rather less difficulty. It should, perhaps, be remarked, in explanation of this, that the specialities of several of the Liége works enable them to secure comparatively regular clients. In the Charleroi group the situation is far from hopeless, although the number of the establishments which have reduced their working hours has rather increased. Prices have continued to rule very low, and this must probably be regarded as a more serious matter even than the scarcity of orders. English casting pig has remained in comparatively little request upon the Belgian markets, at 2*l.* 3s. 6d. per ton; in the Luxembourg casting pig has been maintained at 2*l.* 2s. 6d. per ton. No. 1 iron has been selling in Belgium at 4*l.* 16s. per ton, No. 2 making 5*l.* 2s. per ton, and No. 2 5*l.* 8s. per ton. Plates have been neglected in Belgium, and No. 3 are readily obtainable at 6*l.* 6s. per ton, while No. 3 have made 7*l.* 6s. per ton; plates of commerce have realised 8*l.* 14s. per ton. A good deal of attention is still being devoted in Belgium to the question of the extension of small local railways. The production of pig in the Grand Duchy of Luxembourg last year is officially returned at 334,687 tons.

The Belgian Coal Trade remains in much the same state; sales are, however, falling off with the near approach of the summer. Coalowners in the different basins are, however, fairly content with the situation—at any rate so far as a part of their production is concerned; the difficulty of the moment is the sluggish enquiry for coal for metallurgical purposes, and on this head it is to be feared that there is little immediate prospect of improvement. The demand for coke is extremely limited, and the prices obtained are little satisfactory. Prices have scarcely varied in the German coal trade, and there is no immediate hope of an improvement, notwithstanding the efforts made by coalowners to obtain better terms for their products. They must probably be content if prices do not experience a reduction. The production of coal in the Zollverein last year is officially returned at 55,880,490 tons, of the value of 14,678,040*l.*, as compared with 52,116,326 tons, of the value of 13,392,294*l.* in 1882. The production of lignites in the Zollverein last year is also officially returned at 14,334,966 tons, of the value of 1,935,767*l.*, as compared with 13,234,195 tons, of the value of 1,802,886, in 1882. It will be seen that the increase in the production of coal last year was 3,772,164 tons, or about 7 per cent. The imports of coal into the Zollverein in February were 658,090 tons, and for the first two months of this year 1,411,958 tons.

HOLLOWAY'S PILLS.—The stomach and its troubles cause more discomfort and bring more unhappiness than is commonly supposed. The thousand ills that settle there may be prevented and dislodged by the judicious use of these purifying pills, which act as a sure, gentle, and anti-acid aperient, without annoying the nerves of the most susceptible, or irritating the most delicate organisation. Holloway's pills will bestow comfort and confer relief on every headachy, dyspeptic, and sickly sufferer, whose tortures make him a burden to himself and a nuisance to his friends. These pills have long been the popular remedy for a weak stomach, for a disordered liver, or a paralysed digestion, which yield without difficulty to their regulating, purifying, and tonic qualities.

Original Correspondence.

WEST AFRICAN GOLD MINES—NECESSARY REQUIREMENTS FOR DEVELOPING—No. III.

SIR,—Lastly, the Labour Question: This is undoubtedly one of the greatest troubles. The native race of this part of the country are called Fantees; and without doubt there is not on the face of this beautiful earth a more useless and lazier race of people. I thoroughly know the aboriginal races of Australia from Cape Otway to Cape York, and the red man of America from California to the St. Lawrence. They are classed as the lowest type of humanity, but give me either in preference to the Fantee. They at least will hunt, and can be stimulated to exertion by the promise of reward, and the red man will go in for even cultivating the soil, but these people will do nothing. They will not cultivate the soil, for Nature has been so prolific in her bounteousness they have no occasion to exist. They make their women clear a small piece of land and plant a few plantains, which yield fruit for years, and a little maize to make what they call cankie (a sort of bread made by pounding up the green corn in a wooden vessel with big sticks)—the women have to do this also. In a village or township under authority of police the women have also to sweep the streets and carry away all the garbage; where there is no police authority they just allow it to accumulate and revel in it. The men do nothing but sit down: at the latter performance they are perfect masters, or leaning up against a tree, or the side of a house, or anything else that comes handy to lean against, they are very good at; but if they can find nothing to lean on they sit down. To see one of them move with any agility or to run has never been recorded in the country without there was a dog or policeman at his heels. Nature has also gifted them with great cunning, and a weakness for appropriation, which is strictly enforced on all occasions they get an opportunity; it matters not to the Fantee what it is, whether he has any use for the article or not—he will steal anything he can lay his hands on, provided it is not too heavy to carry away, in which case his laziness controls his kleptomaniac propensities, and he foregoes the pleasure. Happy the Fantee who has succeeded in amassing sufficient money to buy three or four women—he can retire for the remainder of his life; but the unfortunate Fantee that is not the possessor of three or four women must needs go to work. Before the advent of the white man he was a slave to a king or chief, and had to work for them; the white man did away with all that kind of thing, and now he is a slave to laziness. When compelled by hunger to work he applies to the white man, with the firm determination to do the least possible amount of work, and to be as stubbornly dense as his nature will permit; a log of wood is not more dense, and he succeeds in playing his part like a practised professional. The proof of what the Fantee race really are is in the fact of the country remaining a dense forest, whereas by very little exertion on their part they could produce hundreds of tons of rice yearly, for which they would have a ready-money market from Europeans (all the rice for feeding labour having to be imported); and not only rice, but sugar, maize, tobacco, and other tropical productions, with steamers calling regularly at the port, only too glad to take their produce. But no; that would entail work, and the Fantee has sworn off work unless compulsory; he likes money because it enables him to gratify his lazy propensities, but he must get it easy, otherwise he will forego the pleasure, and although existing on plantain and maize he looks with contempt on the white man for his energy and industry.

Of course, there are exceptions to all rules, and there are exceptions among the Fantees, but they are few; in proof of which one of them, an energetic, educated gentleman in every sense of the word, remarked to me in conversation "That the best thing that could happen to the West Coast of Africa was for the British Government to step in, confiscate the land, and destroy all the plantain plantations; then the natives would be compelled to work or cultivate the land to live." This remark from a native of the country will convey to the British public some idea of the race of people that occupy and encumber the lands on the West Coast of Africa.

The rate of wages paid to them is from 12s. to 20s. per month and 1½ lb. rice per day, or 3d. per day substitute money, and no rice. He hires for 12 months, and at the expiration of his term retires for at least two years to live on his capital. The result of this is, a mining manager is continually teaching new hands how to work. At the end of his 12 months, when he is getting useful and understands his work, he leaves; consequently, the manager has to commence and teach a fresh lot. The principal supply of labour is obtained from the Kroo Coast, a country about midway between Sierra Leone and Axim—not British territory. Kroo boys are a superior class of labour to the Fantee, both in physique and tractability; but, unfortunately, they will not engage for a longer term than 12 months—consequently, there is the same trouble with regard to teaching them how to work as the Fantee. These boys also entail extra expense, by having to be brought down the coast in the steamers, and their return passage paid also. There are also the Bassa boys, obtained from Grand Bassa—a class of labour equal to the Kroo boys, but with the same difficulties attendant. Such is the class of labour mining managers have to depend upon in West Africa. The Kroo boys would be valuable labour if they could only be persuaded to engage for three or even two years, or if they could be persuaded to bring their women with them, and settle in the country; but no, he wants to go home at the expiration of his term, and it is only natural they should wish to return to their families and friends.

With regard to settling in the country, I question very much if the Fantee would permit them, for notwithstanding the country is one dense forest and jungle, still there is a claimant (and in many instances a number of them) for every acre of land, and although they will not cultivate it themselves, they would not allow an alien race to come in and do it if they could stop them.

Under such circumstances what is to be done? Suppose that the tramway scheme that I have suggested is favourably received by the public and the Government, the money subscribed for carrying it into execution, where is the labour to come from to make it? With native labour I pity the contractor that undertakes the work. The probability is he will either die or go mad before he completes it. It can only be accomplished, and these mines can only be made to pay, by the introduction of foreign labour, and the only suitable class of labour for this country that can be obtained is the Chinese coolie.

In advocating the introduction of Chinese into this country, I do not speak from hearsay with regard to their character, disposition, and natural proclivities. I know them thoroughly in their own country—in Shanghai, Canton, Hong Kong, and Amoy. I know them also in Australia and the United States. I know that in a country settled with an European population they are not a desirable adjunct, particularly on account of their moral laxity; but I challenge any man to name a more thrifty, industrious, and energetic race of people on the face of the globe. This is the country for Chinamen; there are miles of country that I have travelled over the short time I have been in Africa, that if there was a Chinese population settled in the country would be the busy haunts of hundreds of men working surface ground for gold by sluicing—a thing that these natives have not the remotest idea of how to do, and would be too lazy to do if they knew how—and not only surface ground but beds of streams that it is impossible to say what amount of gold would be obtained from them. The value of mining properties would be increased a hundredfold, for Chinamen would be only too glad to take on tribute portions of mining concessions that I know of at the present time that will never be worked by the companies that own them, for the simple reason they could never make them pay working them with wages men.

I am speaking solely of alluvial ground, and any person that has had any experience among Chinamen knows perfectly well what a small quantity of gold per ton of dirt they will make if there is only an abundant supply of water at hand, and that they have *ad lib.* in scores of places between Axim and Tacquah. Again, the great consideration is that the mines would have a constant supply of first-class labour, and that at a cheap rate. The Chinaman's great object in life is to make money, and has a great aversion to working for wages. He prefers contract work; to break stone in a mine at so much per ton, to cut firewood at so much per cord, and the harder he works the more money he earns; there is no necessity to watch him, he is working for himself. The Fantee requires that you should be continually watching him, otherwise he is sitting down praying for night and the whistle to blow.

Again, if the Chinaman got a footing in this country, in 20 years what is now a dense forest would be waving fields of sugar and maize, and the deadly malarious swamps would be producing thousands of tons of rice. The European would be able to obtain vegetables and fruits, two luxuries he has to dispense with as things exist at present. Sheep and cattle would also be obtainable, for by the country being cleared there would be grass for them to eat; at present at an extortionate cost the Fantee will oblige you as a personal favour sometimes with a sheep. But there is one great difficulty has to be provided for before the Chinaman can be introduced into this country—that is, the land.

As previously stated, from what I can learn the whole of this country was confiscated at the close of the Ashantee war, but never taken possession of by the Crown. If Chinamen are brought into this country they must be able to acquire land, either by purchase or on lease, and it will devolve on the Government to devise a method by which they can obtain it. That is the great difficulty, but I do not for a moment believe it is insurmountable. The benefits that will accrue from the introduction of Chinese labour into this country will be—First, an enormous increase in the revenue, through the increase of both the export and import trade; secondly, the cause of an immense amount of capital being introduced for mining and agriculture; thirdly, a *bona fide* title will be obtainable for lands and mines which does not now exist; lastly, a country that is now a howling wilderness, the home of the leopard and gorilla, will be converted into a vast remunerative productive territory, and peopled by a happy, thrifty, industrious, and energetic race.

Among the gentlemen interested in the welfare of this colony there are many far abler to wield the pen in this cause than I; it is for them, if they deem it worthy, to take action in this matter, and bring it under the notice of the Government; to represent the urgent necessity of immediate action, and their claim to some consideration, that having expended so much money in the colony without receiving any return, the colony was entitled to a little fostering care at the hands of the Government. THOS. J. HAUGHTON, M.E.,

Axim, West Africa, March 7. Mining Engineer and Assayer.

WEST AFRICAN GOLD COAST.

SIR,—Mr. Haughton's second letter in your last issue will, I think, tend to discourage investors in West African gold mines, for after having stated that it takes 2*l.* 5s. per ton to raise 2*l.* 8s. worth of gold he naturally asks—Where is the dividend to come from? He furnishes the answer, however, by saying that if these mines are to be a success there must be a good road made, and such machinery supplied as he describes, and then adds, with these "they will pay handsome dividends, without them they will never repay the shareholders the money already expended."

I think, however, it is a very fortunate circumstance that in the same number of your Journal mention is made of a machine—the Quicksilver Wave Amalgamator—which it is said to do for 1s. what would cost by the process known to Mr. Haughton 30s. or 40s., and moreover, save more gold also. Such a machine would reduce considerably the cost of extracting the gold, and if the Gold Coast Company directors, after, of course, full proof of its efficiency, were to send over one or two, perhaps the makers might take the cost, or part of it, in preference shares, to treat the hundreds of tons of slime deposits, which Mr. Haughton has proved to contain no less than 2 ozs., and up to as many as 45 ozs. per ton. The shareholders would, I think, soon find gold flowing into their pockets in the shape of good dividends, and then, when this is the case, the difficulties spoken of in Mr. Haughton's letter will quickly disappear, for his road, and, perhaps a tramroad, will be made, and the proper machinery supplied to the mines.—*Somerton, Norfolk.* J. BUDD.

THE GOLD COAST COLONY.

SIR,—I notice in last week's *Mining Journal* a reference to Mr. Haughton's communications from the Gold Coast, and a hope expressed that some concerted action may be taken by those interested in Gold Coast affairs. Will you kindly permit me to state that there is in existence a Gold Coast Association, who hold their meetings in the Gold Coast Mining Company's office by kind permission of the directors? There will be a meeting in May, when the matter in question will be discussed, and we should be very glad to receive any suggestions. J. D. POWER, Hon. Sec. *pro tem.*

London, April 30.

MINING IN NEW SOUTH WALES.

SIR,—As usually happens every few years—almost with a certain periodicity—there have been rich finds of gold in various parts of this colony, as well as in Queensland, and mostly in old claims. At Bingera over 2000 ozs. in one small patch; at Hargreaves 800 ozs. in one patch; at Mokerawa rich gold all through the reef, &c.; whilst up at Gympie, in Queensland—the Wilmot Extended and Ellen Harkins—are not only banking specimens of hundreds of ounces weekly, but also raising stone by the hundred tons giving from 10 ozs. up to over 60 ozs. per ton.

The following extract from this day's paper also gives a good idea of mining matters generally, and especially of the lately opened up presumably (for very little real work has yet been done to prove them) rich silver deposits at the Barrier Reefs, just over the border of New South Wales, in South Australia. The Ellen Harkins Gold Mining Company, Gympie, had a splendid crushing of 71 tons of stone, which yielded 4558 ozs. of retorted gold.

At Tamworth the mining manager of the Marquis of Lorne Gold Mining Company, Bowling Alley Point, brought in a very rich specimen of quartz to-day, which he obtained from the last shot in the winze on the east and west reef in that mine. Calculating according to the specimen 1000 ozs. per ton at least will be the yield from the stone. The weather keeps very dry; hot days, and nights very cold.

At Gundagai, Captain Walters, late manager of the Muttama Gold Mining Company, has purchased Crawley and Brown's lease on the Bongongolong reefs, and is making preparations for working the claim and erecting crushing machinery.

At Nymagee the output for the week ending the 15th inst. is 290 tons of smelted ore, producing equal to 49 tons fine copper. There have been refined 40 tons and despatched 42 tons.

The mining manager of the Prince of Wales and Old Poverty Company, Ballarat, reports:—"The contractor for removal and re-erection of machinery is on the ground, all ready to commence work. The shaft has been sunk 13 ft. for the week. Total depth, 270 ft."

The mining manager of the Prince of Wales Gold Mining Company, No Liability, Burnt Yards, reports under date March 15:—"Since my last report the blue shaft has been sunk 23 ft. in depth by 13 ft. in length, and 5 ft. in width. Total depth from surface, 397½ ft. The vein is gradually making larger, the leaders are getting more numerous, and the vein is more thickly impregnated with pyrites. No rain up to date."

The mining manager of the Centennial Prospecting and Baal Gammon Amalgamated Gold Mining Company, No Liability, Copeland, reports under date March 15:—"Since my last report the tunnel has been driven 5 ft.; total distance, 408 ft. The country, I am happy to report, continues moderately easy, and the contractors maintain their improved rate of progress. The general appearance of the face remains unchanged."

The mining manager of the Brickwood Tin Mining Company (Limited) reports under date 15th inst.:—"Deep lead, No. 3 shaft bottomed, and well-hole being put in preparatory to connecting with No. 2 shaft; the wash struck in No. 3 shaft is about 9 in. in depth, and is dipping. In the drive from No. 2 shaft the wash is much about the same as last week, but the quality has improved. Work done for week—Eastern drive from No. 1 shaft, 9 ft.; western drive form No. 2 shaft, 32 ft.; No. 3 sunk 46 ft.; making total depth 96 ft."

The mining manager of the Great Extended Gold Mining Company, Forest Reefs, New South Wales, reports that 200 loads were crushed during the fortnight ending the 15th inst., for a return of 120 ozs. of gold. The foul air greatly interfered with the underground work, and wash dirt could be raised from only one face. Means having been taken to air the mine the output next fortnight should be larger and of the average richness.

The mining manager of the Victory Gold Mining Company (Limited), Charters Towers, Queensland, under date the 8th inst., reports:—"The mine has considerably improved this week, more especially in the drives. In breaking up the reef in the south drive last night it increased in thickness from 2 to 12 in., and appears to be still making. The north drive has been improving all the week, and now shows a nice reef 10 in. thick, with good indications of still opening out. The stopes have much about the same appearance as when last reported. 50 tons were raised for the fortnight; total at surface, 380 tons. During the fortnight the drives have been driven south 13 ft., total 480 ft.; north, 12 ft.; total, 192 ft. Crushing was commenced 4th inst., and I expect to put over 400 tons through. I consider the plates are looking equal to last crushing; but we will be able to judge better after the mill has run a few days more."

The mining managar of the Mookerawa Creek Gold Mining Company, No Liability, Macquarie river, reports by telegraph, March 15:—"Have obtained 22 ozs. 5 dwts. 19 grs. of gold for five days' washing. No rain; water low."

The mining manager, Junction Point Gold Mining Company, No Liability, Macquarie river, reports under date March 15:—"The tunnel has been driven 9 ft.; total distance, 250 ft. There is a change in the roof of the drive, small seams with impressions of roots and decayed vegetation."

The mine captain of the Great Cobar Company reports by wire for week ended 15th inst. as follows:—"Ore smelted 462 tons, producing equal to 55 tons fine copper; 45 tons fine copper despatched; 16 furnaces working."

A correspondent under date Silverton, March 6, sends us the following respecting the Barrier Silver Mines:—"These mines are situated about 10 miles in a north-easterly direction from Silverton. Amidst a chaos of rugged hills are the Sinclair Mines, Kitto's Mines, Crisp's Hen and Chickens, the Robbie Burns, the Pioneer, Murchie's Big Blow, all of which yield a fabulous high percentage of silver: 5 miles further north is situated the One Tree, known as Leadville, where a great number of rich lodes have been found. The claims of Nichols and Co., Collins and Co., the Joe de Marine, Crisp's Lubra, the Pluck Up, the Bird in Hand, the Norwood Lads, the Black Prince, and scores of others too numerous to mention, have given assays of 1000 ozs. to 14,000 ozs. to the ton. Many of these mines are hardly opened and developed on account of want of capital. A great many mines in this district are held by poor men, and consequently cannot be developed. Capitalists are required, as the only capitalists now on the ground are a syndicate. I have myself seen most of these properties, and can safely say with the opinion of experienced miners from all parts of the colonies that there is not a better opening for capital in all Australia. As regards the reported scarcity of water, provisions, horsefeed, prevalence of sickness, &c., I must say that it is beyond doubt that these discouraging reports are being brought in circulation by men largely interested in the field, who wish to stop at any price the further influx of speculators. A scarcity of water exists in some parts of the range, but not by far as bad as has been represented. Umberumberka (Silverton) is supplied by two wells—one the property of Mundi Mundi Station, the other the property of Charles Carl, an old settler on the range. The water is a little brackish, but not unfit for cooking purposes, while fresh water is being carted by teams from Thackaringa. The Hen and Chickens, Merchie's Big Blow, and other mines obtain their supply from surface tanks, which were filled from a thunder shower about 10 or 12 days ago, and the Leadville district is sufficiently supplied with fresh water obtained as soakage in three distinct creeks at only about 3 feet sinking. As far as other parts of the range are concerned I uphold that even a footman can, with the assistance of a water-bag, travel from one end to the other of the whole length of the barrier. The track from Terowie is good. Water can be obtained at all stages, never exceeding 20 miles at the outside. Messrs. M'Gowan and Rayner are running two coaches weekly from Terowie, and will put on more as soon as they have a sufficient supply of horse feed carted along the line. As regards the health of the inhabitants it may be said that it could not be better; indeed, there is no sickness of any kind in any part of the range. We have a medical officer on the field, who came up some two months ago, but up till now he has been almost on the list of the unemployed. Provisions are plentiful, and reasonable in price. Horse feed is also plentiful, and is retailed at 7s. per bag at Silverton."

The following is the return of tin ore received at Newcastle and Morpeth for the week ended March 8:—From Armidale to Newcastle, 7 tons 19 cwts.; Uralla to Newcastle, 7 tons 12 cwts.; Uralfa to Morpeth, 31 tons 6 cwts.: total, 46 tons 17 cwts.

The following is a return of copper received at Darling Harbour Station for the week ended March 1:—From Nyngan, 247 tons 10 cwts.; Orange, 13 tons 10 cwts.; Whitton, 1 ton 9 cwts. 3 qrs.: total, 262 tons 9 cwts. 3 qrs. For the week ended March 8 the quantity was 169 tons 10 cwts. 2 qrs., of which there was—from Nyngan, 107 tons 3 cwts. 2 qrs.; Orange, 11 tons 2 cwts.; Old Junee, 2 tons; Whitton, 10 tons; Esk Bank, 36; Carrathool, 3 tons 5 cwts.

Sydney, March 20. R. D. A.

THE TRANSVAAL GOLD FIELDS.

SIR,—In last week's *Mining Journal* you publish an extract from the Cape Times relative to an article I wrote for the Pall Mall Gazette of Jan. 30 on the Transvaal Gold Fields. I need scarcely say that generally the paragraph in question is as untruthful as it is malignant. It is, however, quite possible that in consequence of the Cape being a wine-producing country the writer's memory may be a little treacherous. My report to the Government on the auriferous character of the Knysna was published more than five years ago, and to show you and the public the opinion the Cape Times then entertained of Mr. Kitto's report, I attach a clipping from a leading article which appeared in that valuable paper of March 5, 1879, and without exception the same sentiment was expressed by every newspaper in South Africa:—"There is a gentleman now in the country whose Australian and Californian experience, not as a mere miner, but as a discoverer of mines, might render his services very valuable in unearthing the mineral wealth of this country. The report of this gentleman on the Karatara gold district was a document bearing the impress of training and experience. In that report there was no jumping at conclusions, no concession to the popular appetite for great expectations, no trace of hasty generalisations drawn from the observation of others. At Karatara, we believe, very little gold has been found yet, and in this respect Mr. Kitto's judgment is verified, for he does not expect that any quantity of gold will be found there except by means of an expensive working which put Karataras out of the field as a poor man's digging. But the colour of gold is extensively found over this country, and we submit that it would be a fair venture on the part of Government to give for a definite period a roving commission to the gentleman who reported on the auriferous deposits of Karatara. There may be alluvial gold in quantity somewhere at no great distance; and, at all events, as the indication of gold abound a little money spent in ascertaining the meaning of these indications would be well laid out." It would be impossible to write in more flattering terms of any mining man. And I have no doubt the change which has since come over the spirit of the Cape Times is owing entirely to the publication of those unpalatable though honest reports of mine which prevented the enriching of a certain set of South Africans at the expense of the English. As to the known gold fields of the Transvaal their present non-success is owing entirely to the inauguration of a system that is in no way adapted to the requirements of the place, and whatever may be the value of the present gold fields I know of very extensive tracts of country in the Transvaal which, in my opinion, are much better. When I wrote—"The Transvaal will never be a great gold-producing country as compared to Australia or California," it was in reply to the various reports which stated "they were the richest gold fields ever discovered in the world." I distinctly pointed to half-a-dozen places that would pay very well if properly conducted, but I regret to say they are not being properly conducted, and consequently they are not likely to pay very well.—*Gunnersbury, April 28.* THOS C. KITTO.

BELL'S ASBESTOS.

BELL'S PATENT ASBESTOS BLOCK PACKING, for High Pressure Engines. This Packing has been specially designed to overcome the difficulties experienced by engineers and others in the practical working of engines of the most modern type of construction. The greatly increased skill and workmanship now obtained in the construction of engines and boilers have led to a rapid increase in the working pressure, the object being the attainment of a high rate of speed combined with economical working, the practical advantage of which, however, cannot be realised unless the Packings are so constructed as to avoid stoppages for the purpose of re-packing the stuffing boxes. It is now a recognised fact that the most perfect heat-resisting material suitable for the purpose of a Packing is Asbestos, but to ensure a successful application of this fibre, great skill is required in manufacture. In this Packing the Asbestos is woven into a stout cloth, and owing to the peculiar way in which it is manipulated, great elasticity is imparted to the Packing. This Packing has met with the most unqualified approval wherever it has been used, and on being taken out after about twelve months, working at 70 lb. pressure, it has been found to be in a perfect state of preservation, and was therefore replaced. The Patent Block Packing is square, as Fig. 1, and Figs. 2 and 3 represent the Round Block Packing with solid and hollow rubber core, and Fig. 4 without core, but with rubber inlaid. An Engineer writes as follows:—"The Asbestos Block Packing works splendidly. I have never seen its equal. We keep our gland nuts so that you can move them with finger and thumb, and can maintain a constant vacuum of 28½ in." As these packings are extensively imitated, and as it is a common practice among dealers and agents to supply the cheaper manufactures at my list prices, users are requested to see that the packing supplied to them bears my trade mark.

TRADE MARK.

The goods of this house are of the highest quality only, and no attempt is made to compete with other manufacturers by the supply of inferior materials at low prices. All orders must be sent direct to the undermentioned depôts and not through Agents or Factors.

BELL'S ASBESTOS BOILER PRESERVATIVE. This useful mixture by absorbing the free oxygen that is in the water entirely checks pitting and corrosion. It also disintegrates incrustation so immediately as to prevent its adhering to the plates. Not only is a great economy of fuel effected by keeping boilers clean, but the risk of having the plates burned is thereby obviated. It has been computed that 1/16 in. thick of incrustation causes a waste of 15 per cent. of coal; ¼ in., 60 per cent.; ½ in., 150 per cent. Thus the Preservative avoids the great risks which are inseparable from scaled plates, lengthens the life of a boiler and covers its own cost a hundred-fold by economy of fuel. It is entirely harmless, and has no injurious action on metals. It can be put into the feed tank or boiler, as may be most convenient. Sold in drums and casks bearing the Trade Mark, without which none is genuine.

BELL'S ASBESTOS YARN and SOAPSTONE PACKING

for Locomotives, and all Stationary Engines running at very high speed with intense friction.

The following Testimonial refers to this Packing:—

Festiniog Railway, Locomotive Superintendent's Office,
Portmadoc, January 13, 1883.

Mr. John Bell, 118, Southwark-street, S.E.

DEAR SIR,

I have much pleasure in saying that the Asbestos Yarn and Soapstone Packing gives every satisfaction; indeed, better than we expected. We have a locomotive packed with it, which has been running five months (and think of the piston speed with our small wheels). I think the Soapstone a great improvement, as it keeps the packing elastic, and prevents it getting hard. I am very pleased with its working, and also the very low price for such good lasting Packing. The Asbestos Yarn we find is very useful, and answers admirably.

Yours truly,
(Signed) W. WILLIAMS.

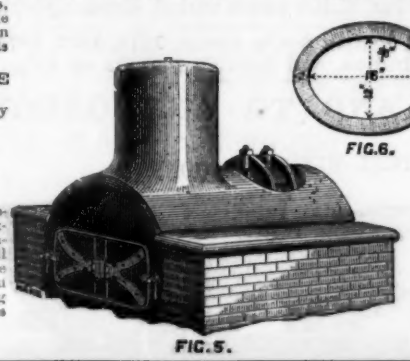


FIG. 5.

FIG. 6.

FIG. 1.

FIG. 2.

FIG. 4.

FIG. 3.

BELL'S ASBESTOS BOILER AND PIPE COVERING COMPOSITION, for coating every class of steam pipes and boilers, non-combustible and easily applied when steam is up; adheres to metals and preserves them from rust; prevents the unequal expansion and contraction of boilers exposed to weather; covers 30 per cent. more surface than any other coating, and is absolutely indestructible. It can be stripped off after many years' use, mixed up with 20 per cent. of fresh, and applied again. The composition is supplied dry, and is only to be mixed with water to the consistency required for use.

A Horizontal Boiler, 17 ft. 6 in. long, 15-H.P., gave the following results:—

Temperature on Plates - - - 186 deg.
" " Covering - - 94 deg.

One ton of coal was saved per week, and although the fire was raked out every evening, 20 lbs. of steam were found in the boiler next morning.

The following Testimonial refers to this Covering:—

Offices of the Wimbledon Local Board, Wimbledon,
Nov. 28th, 1883.

DEAR SIR,—It may interest you to know that we save exactly 40 per cent. in fuel through using your covering.—Yours truly, W. SANTO CRIMP, C.E., F.G.S.

BELL'S ASBESTOS and INDIA-RUBBER WOVEN TAPE and SHEETING, for making every class of Steam and Water Joints. It can be bent by hand to the form required, without puckering, and is especially useful in making joints of manhole and mudhole doors; also for large "still" joints where boiling fat and steam have to be resisted. It is kept in stock in rolls of 100 ft., from ⅛ in. (Fig. 6) to 3 in. wide, and any thickness from 1/16 in. upwards. Manhole covers can be lifted many times before the renewal of the jointing material is necessary. The same material is made up into sheets about 40 in. square, and each sheet bears the Trade Mark, without which none is genuine. It is very necessary to guard against imitations of this useful material, and to secure themselves against being supplied with these inferior articles at my price, users are recommended to see that every 10 ft. length of the Asbestos Tape purchased by them bears the Trade Mark.

BELL'S SPECIAL LONDON-MADE ASBESTOS MILLBOARD, for Dry Steam Joints, made of the best Asbestos fibre, is well-known for its toughness and purity, and is absolutely free from the injurious ingredients frequently used to attain an appearance of finish, regardless of the real utility of the material. Made in sheets measuring about 40 in. square, from 1-64th in. to 1 in., and ½ millimetre to 25 millimetres thick. Each sheet bears the Trade Mark.

BELL'S ASBESTOS EXPANSION SHEETING (PATENT).

This Sheeting is another combination of Asbestos with India-rubber, giving to the steam user the special advantages of both materials.

The India-rubber Washer is protected from the action of heat and grease by an outer coating of vulcanised Asbestos Cloth, thus producing an excellent joint where expansion and contraction render other materials unserviceable.

This material is admirably suited to steam pipe joints and every class of valve.

Valves made of this material are very durable, as they are not subject to injury by oil.

BELL'S "ASBESTOS LUBRICANT."

ILLUSTRATED PRICED CATALOGUE FREE ON APPLICATION TO

BELL'S ASBESTOS WORKS, SOUTHWARK, LONDON, S. E.

OR THE DEPOTS—**118a, SOUTHWARK STREET, S.E.,**

Victoria Buildings, Deansgate, MANCHESTER. 11 and 13, St. Vincent Place, GLASGOW. 39, Mount Stuart Square, CARDIFF. 21, Ritter Strasse, BERLIN.

SAMUEL OSBORN AND CO.,

MANUFACTURERS OF TOUGHENED

CRUCIBLE STEEL CASTINGS

Of all descriptions of special strength and solidity.

ALSO, MANUFACTURERS OF

BEST CAST STEEL FOR ENGINEERS AND MINERS' PURPOSES; FILES; SAWS; HAMMERS; RAILWAY SPRINGS, &c.

STEEL SHEETS AND FORGINGS.

SOLE MAKERS OF

R. MUSHET'S CELEBRATED EXTRA BEST

TITANIC CAST STEEL FOR BORERS,

And of R. Mushet's pecial Steel for Lathe and Planing Tools and Drills,

THE STEEL WHICH REQUIRES NO HARDENING.

CLYDE STEEL AND IRON WORKS, SHEFFIELD.

PUMPS FOR MINING USE.

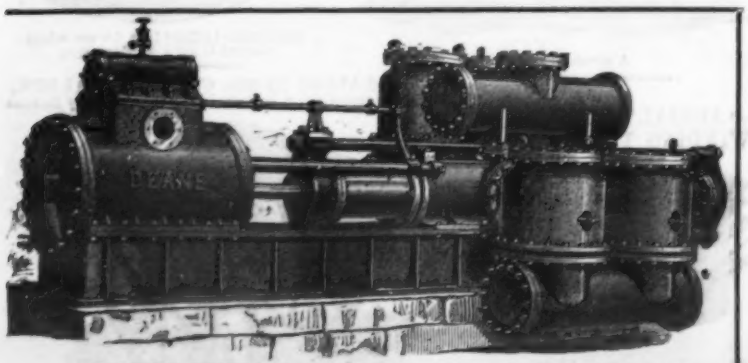
PULSOMETER ENGINEERING COMPANY, LIMITED,

NINE ELMS IRONWORKS, LONDON, S.W.

City Offices—61 and 63, QUEEN VICTORIA STREET, E.C.

EVERY MINING ENGINEER should have the company's profusely illustrated general catalogue, 140 pages, cloth, price 3s., in stamps of any country. Circulars free.

THE PULSOMETER is especially adapted to use underground as it will pass gritty water freely, having no moving parts except the simple valves. IT HAS NO EXHAUST, and will work suspended on a chain. It is suitable for lifts not over about 80 feet total. It is also most satisfactorily employed for coal washing purposes.



DOUBLE PLUNGER PUMP, with 30 in. Steam Cylinder, 14 in. Plungers, and 36 in. Stroke. Can be made compound and condensing if required. (Please mention this advertisement.)

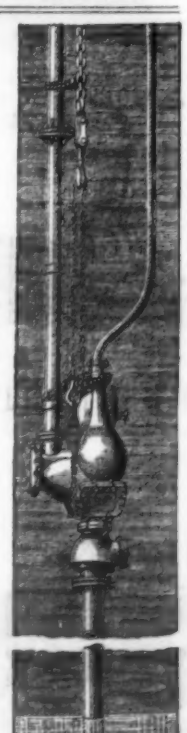
VERTICAL STEAM PUMPS FOR SINKING.

LIGHT WROUGHT IRON FLANGE PIPE

STEAM HOSE.

PULSOMETER FOR COAL WASHING, SINKING, &c.

ON HIRE, WITH OPTION OF PURCHASE BY ARRANGEMENT.



PULSOMETER PUMP suspended on a chain.

FOREIGN MINING AND METALLURGY.

Attempts are being made to secure a higher range of prices in the French Iron Trade, but it is difficult to discover any change in the situation which is at all calculated to justify or support such proceedings. In the Longwy basin the stock of pig in hand remains considerable; it is composed of about 20,000 tons of refining and 60,000 tons of casting pig. In presence of these totals refining pig has been selling at 2*l.* 2s. 6d. to 2*l.* 4s. per ton in the case of transactions of any serious importance, while No. 3 casting pig has made 2*l.* 11s. 6d. to 2*l.* 12s. per ton. Casting pig has, for the rest, continued neglected, and nothing has occurred to induce hopes of an improvement for some time to come. The stock of refining pig has been declining in France of late, principally in consequence of the blowing out of a number of blast-furnaces. It should, however, be noted that two new furnaces are about to be lighted. The imports of iron minerals into France in the first three months of this year amounted to 349,528 tons, as compared with 378,863 tons in the corresponding period of 1883, and 327,550 tons in the corresponding period of 1882. The imports of Spanish iron minerals in the first quarter of this year were especially heavy. The condition of the German iron trade has not materially changed. The demand for pig has fallen off, but iron has continued in sufficient request to maintain a tolerable activity in affairs.

Transactions have continued restricted in the Belgian iron trade. In the Liége basin business has been sustained rather more firmly than in the Charleroi district, employment being more abundant, while transactions are carried through with rather less difficulty. It should, perhaps, be remarked, in explanation of this, that the specialities of several of the Liége works enable them to secure comparatively regular clients. In the Charleroi group the situation is far from hopeless, although the number of the establishments which have reduced their working hours has rather increased. Prices have continued to rule very low, and this must probably be regarded as a more serious matter even than the scarcity of orders. English casting pig has remained in comparatively little request upon the Belgian markets, at 2*l.* 3s. 6d. per ton; in the Luxembourg casting pig has been maintained at 2*l.* 2s. 6d. per ton. No. 1 iron has been selling in Belgium at 4*l.* 16s. per ton, No. 2 making 5*l.* 2s. per ton, and No. 2 5*l.* 8s. per ton. Plates have been neglected in Belgium, and No. 3 are readily obtainable at 6*l.* 6s. per ton, while No. 3 have made 7*l.* 6s. per ton; plates of commerce have realised 8*l.* 14s. per ton. A good deal of attention is still being devoted in Belgium to the question of the extension of small local railways. The production of pig in the Grand Duchy of Luxembourg last year is officially returned at 334,687 tons.

The Belgian Coal Trade remains in much the same state; sales are, however, falling off with the near approach of the summer. Coalowners in the different basins are, however, fairly content with the situation—at any rate so far as a part of their production is concerned; the difficulty of the moment is the sluggish enquiry for coal for metallurgical purposes, and on this head it is to be feared that there is little immediate prospect of improvement. The demand for coke is extremely limited, and the prices obtained are little satisfactory. Prices have scarcely varied in the German coal trade, and there is no immediate hope of an improvement, notwithstanding the efforts made by coalowners to obtain better terms for their products. They must probably be content if prices do not experience a reduction. The production of coal in the Zollverein last year is officially returned at 55,880,490 tons, of the value of 14,678,040*l.*, as compared with 52,116,326 tons, of the value of 13,392,294*l.* in 1882. The production of lignites in the Zollverein last year is also officially returned at 14,334,966 tons, of the value of 1,935,767*l.*, as compared with 13,234,195 tons, of the value of 1,802,886, in 1882. It will be seen that the increase in the production of coal last year was 3,772,164 tons, or about 7 per cent. The imports of coal into the Zollverein in February were 658,090 tons, and for the first two months of this year 1,411,958 tons.

HOLLOWAY'S PILLS.—The stomach and its troubles cause more discomfort and bring more unhappiness than is commonly supposed. The thousand ills that settle there may be prevented and dislodged by the judicious use of these purifying pills, which act as a sure, gentle, and anti-acid aperient, without annoying the nerves of the most susceptible, or irritating the most delicate organisation. Holloway's pills will bestow comfort and confer relief on every headachy, dyspeptic, and sickly sufferer, whose tortures make him a burden to himself and a nuisance to his friends. These pills have long been the popular remedy for a weak stomach, for a disordered liver, or a paralysed digestion, which yield without difficulty to their regulating, purifying, and tonic qualities.

Original Correspondence.

WEST AFRICAN GOLD MINES—NECESSARY REQUIREMENTS FOR DEVELOPING—No. III.

SIR,—Lastly, the Labour Question: This is undoubtedly one of the greatest troubles. The native race of this part of the country are called Fantees; and without doubt there is not on the face of this beautiful earth a more useless and lazier race of people. I thoroughly know the aboriginal races of Australia from Cape Otway to Cape York, and the red man of America from California to the St. Lawrence. They are classed as the lowest type of humanity, but give me either in preference to the Fantee. They at least will hunt, and can be stimulated to exertion by the promise of reward, and the red man will go in for even cultivating the soil, but these people will do nothing. They will not cultivate the soil, for Nature has been so prolific in her bounteousness that they have no occasion to exist. They make their women clear a small piece of land and plant a few plantains, which yield fruit for years, and a little maize to make what they call cankie (a sort of bread made by pounding up the green corn in a wooden vessel with big sticks)—the women have to do this also. In a village or township under authority of police the women have also to sweep the streets and carry away all the garbage; where there is no police authority they just allow it to accumulate and revel in it. The men do nothing but sit down: at the latter performance they are perfect masters, or leaning up against a tree, or the side of a house, or anything else that comes handy to lean against, they are very good at; but if they can find nothing to lean on they sit down. To see one of them move with any agility or to run has never been recorded in the country without there was a dog or policeman at his heels. Nature has also gifted them with great cunning, and a weakness for appropriation, which is strictly enforced on all occasions they get an opportunity; it matters not to the Fantee what it is, whether he has any use for the article or not—he will steal anything he can lay his hands on, provided it is not too heavy to carry away, in which case his laziness controls his kleptomaniac propensities, and he foregoes the pleasure. Happy the Fantee who has succeeded in amassing sufficient money to buy three or four women—he can retire for the remainder of his life; but the unfortunate Fantee that is not the possessor of three or four women must needs go to work. Before the advent of the white man he was a slave to a king or chief, and had to work for them; the white man did away with all that kind of thing, and now he is a slave to laziness. When compelled by hunger to work he applies to the white man, with the firm determination to do the least possible amount of work, and to be as stubbornly dense as his nature will permit; a log of wood is not more dense, and he succeeds in playing his part like a practised professional. The proof of what the Fantee race really are is in the fact of the country remaining a dense forest, whereas by very little exertion on their part they could produce hundreds of tons of rice yearly, for which they would have a ready-money market from Europeans (all the rice for feeding labour having to be imported); and not only rice, but sugar, maize, tobacco, and other tropical productions, with steamers calling regularly at the port, only too glad to take their produce. But no; that would entail work, and the Fantee has sworn off work unless compulsory; he likes money because it enables him to gratify his lazy propensities, but he must get it easy, otherwise he will forego the pleasure, and although existing on plantain and maize he looks with contempt on the white man for his energy and industry.

Of course, there are exceptions to all rules, and there are exceptions among the Fantees, but they are few; in proof of which one of them, an energetic, educated gentleman in every sense of the word, remarked to me in conversation "That the best thing that could happen to the West Coast of Africa was for the British Government to step in, confiscate the land, and destroy all the plantain plantations; then the natives would be compelled to work or cultivate the land to live." This remark from a native of the country will convey to the British public some idea of the race of people that occupy and encumber the lands on the West Coast of Africa.

The rate of wages paid to them is from 12s. to 20s. per month and 1½ lb. rice per day, or 3d. per day substitute money, and no rice. He hires for 12 months, and at the expiration of his term retires for at least two years to live on his capital. The result of this is, a mining manager is continually teaching new hands how to work. At the end of his 12 months, when he is getting useful and understands his work, he leaves; consequently, the manager has to commence and teach a fresh lot. The principal supply of labour is obtained from the Kroo Coast, a country about midway between Sierra Leone and Axim—not British territory. Kroo boys are a superior class of labour to the Fantee, both in physique and tractability; but, unfortunately, they will not engage for a longer term than 12 months—consequently, there is the same trouble with regard to teaching them how to work as the Fantee. These boys also entail extra expense, by having to be brought down the coast in the steamers, and their return passage paid also. There are also the Bassa boys, obtained from Grand Bassa—a class of labour equal to the Kroo boys, but with the same difficulties attendant. Such is the class of labour mining managers have to depend upon in West Africa. The Kroo boys would be valuable labour if they could only be persuaded to engage for three or even two years, or if they could be persuaded to bring their women with them, and settle in the country; but no, he wants to go home at the expiration of his term, and it is only natural they should wish to return to their families and friends.

With regard to settling in the country, I question very much if the Fantee would permit them, for notwithstanding the country is one dense forest and jungle, still there is a claimant (and in many instances a number of them) for every acre of land, and although they will not cultivate it themselves, they would not allow an alien race to come in and do it if they could stop them.

Under such circumstances what is to be done? Suppose that the tramway scheme that I have suggested is favourably received by the public and the Government, the money subscribed for carrying it into execution, where is the labour to come from to make it? With native labour I pity the contractor that undertakes the work. The probability is he will either die or go mad before he completes it. It can only be accomplished, and these mines can only be made to pay, by the introduction of foreign labour, and the only suitable class of labour for this country that can be obtained is the Chinese coolie.

In advocating the introduction of Chinese into this country, I do not speak from hearsay with regard to their character, disposition, and natural proclivities. I know them thoroughly in their own country—in Shanghai, Canton, Hong Kong, and Amoy. I know them also in Australia and the United States. I know that in a country settled with an European population they are not a desirable adjunct, particularly on account of their moral laxity; but I challenge any man to name a more thrifty, industrious, and energetic race of people on the face of the globe. This is the country for Chinamen; there are miles of country that I have travelled over the short time I have been in Africa, that if there was a Chinese population settled in the country would be the busy haunts of hundreds of men working surface ground for gold by sluicing—a thing that these natives have not the remotest idea of how to do, and would be too lazy to do if they knew how—and not only surface ground but beds of streams that it is impossible to say what amount of gold would be obtained from them. The value of mining properties would be increased a hundredfold, for Chinamen would be only too glad to take on tribute portions of mining concessions that I know of at the present time that will never be worked by the companies that own them, for the simple reason they could never make them pay working them with wages men.

I am speaking solely of alluvial ground, and any person that has had any experience among Chinamen knows perfectly well what a small quantity of gold per ton of dirt they will make if there is only an abundant supply of water at hand, and that they have *ad lib.* in scores of places between Axim and Tacquah. Again, the great consideration is that the mines would have a constant supply of first-class labour, and that at a cheap rate. The Chinaman's great object in life is to make money, and has a great aversion to working for wages. He prefers contract work; to break stone in a mine at so much per ton, to cut firewood at so much per cord, and the harder he works the more money he earns; there is no necessity to watch him, he is working for himself. The Fantee requires that you should be continually watching him, otherwise he is sitting down praying for night and the whistle to blow.

Again, if the Chinaman got a footing in this country, in 20 years what is now a dense forest would be waving fields of sugar and maize, and the deadly malarious swamps would be producing thousands of tons of rice. The European would be able to obtain vegetables and fruits, two luxuries he has to dispense with as things exist at present. Sheep and cattle would also be obtainable, for by the country being cleared there would be grass for them to eat; at present at an extortionate cost the Fantee will oblige you as a personal favour sometimes with a sheep. But there is one great difficulty has to be provided for before the Chinaman can be introduced into this country—that is, the land.

As previously stated, from what I can learn the whole of this country was confiscated at the close of the Ashantee war, but never taken possession of by the Crown. If Chinamen are brought into this country they must be able to acquire land, either by purchase or on lease, and it will devolve on the Government to devise a method by which they can obtain it. That is the great difficulty, but I do not for a moment believe it is insurmountable. The benefits that will accrue from the introduction of Chinese labour into this country will be—First, an enormous increase in the revenue, through the increase of both the export and import trade; secondly, the cause of an immense amount of capital being introduced for mining and agriculture; thirdly, a *bona fide* title will be obtainable for lands and mines which does not now exist; lastly, a country that is now a howling wilderness, the home of the leopard and gorilla, will be converted into a vast remunerative productive territory, and peopled by a happy, thrifty, industrious, and energetic race.

Among the gentlemen interested in the welfare of this colony there are many far abler to wield the pen in this cause than I; it is for them, if they deem it worthy, to take action in this matter, and bring it under the notice of the Government; to represent the urgent necessity of immediate action, and their claim to some consideration, that having expended so much money in the colony without receiving any return, the colony was entitled to a little fostering care at the hands of the Government. THOS. J. HAUGHTON, M.E.,

Axim, West Africa, March 7. Mining Engineer and Assayer.

WEST AFRICAN GOLD COAST.

SIR,—Mr. Haughton's second letter in your last issue will, I think, tend to discourage investors in West African gold mines, for after having stated that it takes 2*l.* 5s. per ton to raise 2*l.* 8s. worth of gold he naturally asks—Where is the dividend to come from? He furnishes the answer, however, by saying that if these mines are to be a success there must be a good road made, and such machinery supplied as he describes, and then adds, with these "they will pay handsome dividends, without them they will never repay the shareholders the money already expended."

I think, however, it is a very fortunate circumstance that in the same number of your Journal mention is made of a machine—the Quicksilver Wave Amalgamator—which it is said to do for 1s. what would cost by the process known to Mr. Haughton 30s. or 40s., and moreover, save more gold also. Such a machine would reduce considerably the cost of extracting the gold, and if the Gold Coast Company directors, after, of course, full proof of its efficiency, were to send over one or two, perhaps the makers might take the cost, or part of it, in preference shares, to treat the hundreds of tons of slime deposits, which Mr. Haughton has proved to contain no less than 2 ozs., and up to as many as 45 ozs. per ton. The shareholders would, I think, soon find gold flowing into their pockets in the shape of good dividends, and then, when this is the case, the difficulties spoken of in Mr. Haughton's letter will quickly disappear, for his road, and, perhaps a tramroad, will be made, and the proper machinery supplied to the mines.—*Somerton, Norfolk.* J. BUDD.

THE GOLD COAST COLONY.

SIR,—I notice in last week's *Mining Journal* a reference to Mr. Haughton's communications from the Gold Coast, and a hope expressed that some concerted action may be taken by those interested in Gold Coast affairs. Will you kindly permit me to state that there is in existence a Gold Coast Association, who hold their meetings in the Gold Coast Mining Company's office by kind permission of the directors? There will be a meeting in May, when the matter in question will be discussed, and we should be very glad to receive any suggestions. J. D. POWER, Hon. Sec. *pro tem.*

London, April 30.

MINING IN NEW SOUTH WALES.

SIR,—As usually happens every few years—almost with a certain periodicity—there have been rich finds of gold in various parts of this colony, as well as in Queensland, and mostly in old claims. At Bingera over 2000 ozs. in one small patch; at Hargreaves 800 ozs. in one patch; at Mokerawa rich gold all through the reef, &c.; whilst up at Gympie, in Queensland—the Wilmot Extended and Ellen Harkins—are not only banking specimens of hundreds of ounces weekly, but also raising stone by the hundred tons giving from 10 ozs. up to over 60 ozs. per ton.

The following extract from this day's paper also gives a good idea of mining matters generally, and especially of the lately opened up presumably (for very little real work has yet been done to prove them) rich silver deposits at the Barrier Reefs, just over the border of New South Wales, in South Australia. The Ellen Harkins Gold Mining Company, Gympie, had a splendid crushing of 71 tons of stone, which yielded 4558 ozs. of retorted gold.

At Tamworth the mining manager of the Marquis of Lorne Gold Mining Company, Bowling Alley Point, brought in a very rich specimen of quartz to-day, which he obtained from the last shot in the winze on the east and west reef in that mine. Calculating according to the specimen 1000 ozs. per ton at least will be the yield from the stone. The weather keeps very dry; hot days, and nights very cold.

At Gundagai, Captain Walters, late manager of the Muttama Gold Mining Company, has purchased Crawley and Brown's lease on the Bongongolong reefs, and is making preparations for working the claim and erecting crushing machinery.

At Nymagee the output for the week ending the 15th inst. is 290 tons of smelted ore, producing equal to 49 tons fine copper. There have been refined 40 tons and despatched 42 tons.

The mining manager of the Prince of Wales and Old Poverty Company, Ballarat, reports:—"The contractor for removal and re-erection of machinery is on the ground, all ready to commence work. The shaft has been sunk 13 ft. for the week. Total depth, 270 ft."

The mining manager of the Prince of Wales Gold Mining Company, No Liability, Burnt Yards, reports under date March 15:—"Since my last report the blue shaft has been sunk 23 ft. in depth by 13 ft. in length, and 5 ft. in width. Total depth from surface, 397½ ft. The vein is gradually making larger, the leaders are getting more numerous, and the vein is more thickly impregnated with pyrites. No rain up to date."

The mining manager of the Centennial Prospecting and Baal Gammon Amalgamated Gold Mining Company, No Liability, Copeland, reports under date March 15:—"Since my last report the tunnel has been driven 5 ft.; total distance, 408 ft. The country, I am happy to report, continues moderately easy, and the contractors maintain their improved rate of progress. The general appearance of the face remains unchanged."

The mining manager of the Brickwood Tin Mining Company (Limited) reports under date 15th inst.:—"Deep lead, No. 3 shaft bottomed, and well-hole being put in preparatory to connecting with No. 2 shaft; the wash struck in No. 3 shaft is about 9 in. in depth, and is dipping. In the drive from No. 2 shaft the wash is much about the same as last week, but the quality has improved. Work done for week—Eastern drive from No. 1 shaft, 9 ft.; western drive form No. 2 shaft, 32 ft.; No. 3 sunk 46 ft.; making total depth 96 ft."

The mining manager of the Great Extended Gold Mining Company, Forest Reefs, New South Wales, reports that 200 loads were crushed during the fortnight ending the 15th inst., for a return of 120 ozs. of gold. The foul air greatly interfered with the underground work, and wash dirt could be raised from only one face. Means having been taken to air the mine the output next fortnight should be larger and of the average richness.

The mining manager of the Victory Gold Mining Company (Limited), Charters Towers, Queensland, under date the 8th inst., reports:—"The mine has considerably improved this week, more especially in the drives. In breaking up the reef in the south drive last night it increased in thickness from 2 to 12 in., and appears to be still making. The north drive has been improving all the week, and now shows a nice reef 10 in. thick, with good indications of still opening out. The stopes have much about the same appearance as when last reported. 50 tons were raised for the fortnight; total at surface, 380 tons. During the fortnight the drives have been driven south 13 ft., total 480 ft.; north, 12 ft.; total, 192 ft. Crushing was commenced 4th inst., and I expect to put over 400 tons through. I consider the plates are looking equal to last crushing; but we will be able to judge better after the mill has run a few days more."

The mining managar of the Mookerawa Creek Gold Mining Company, No Liability, Macquarie river, reports by telegraph, March 15:—"Have obtained 22 ozs. 5 dwts. 19 grs. of gold for five days' washing. No rain; water low."

The mining manager, Junction Point Gold Mining Company, No Liability, Macquarie river, reports under date March 15:—"The tunnel has been driven 9 ft.; total distance, 250 ft. There is a change in the roof of the drive, small seams with impressions of roots and decayed vegetation."

The mine captain of the Great Cobar Company reports by wire for week ended 15th inst. as follows:—"Ore smelted 462 tons, producing equal to 55 tons fine copper; 45 tons fine copper despatched; 16 furnaces working."

A correspondent under date Silverton, March 6, sends us the following respecting the Barrier Silver Mines:—"These mines are situated about 10 miles in a north-easterly direction from Silverton. Amidst a chaos of rugged hills are the Sinclair Mines, Kitto's Mines, Crisp's Hen and Chickens, the Robbie Burns, the Pioneer, Murchie's Big Blow, all of which yield a fabulous high percentage of silver: 5 miles further north is situated the One Tree, known as Leadville, where a great number of rich lodes have been found. The claims of Nichols and Co., Collins and Co., the Joe de Marine, Crisp's Lubra, the Pluck Up, the Bird in Hand, the Norwood Lads, the Black Prince, and scores of others too numerous to mention, have given assays of 1000 ozs. to 14,000 ozs. to the ton. Many of these mines are hardly opened and developed on account of want of capital. A great many mines in this district are held by poor men, and consequently cannot be developed. Capitalists are required, as the only capitalists now on the ground are a syndicate. I have myself seen most of these properties, and can safely say with the opinion of experienced miners from all parts of the colonies that there is not a better opening for capital in all Australia. As regards the reported scarcity of water, provisions, horsefeed, prevalence of sickness, &c., I must say that it is beyond doubt that these discouraging reports are being brought in circulation by men largely interested in the field, who wish to stop at any price the further influx of speculators. A scarcity of water exists in some parts of the range, but not by far as bad as has been represented. Umberumberka (Silverton) is supplied by two wells—one the property of Mundi Mundi Station, the other the property of Charles Carl, an old settler on the range. The water is a little brackish, but not unfit for cooking purposes, while fresh water is being carted by teams from Thackaringa. The Hen and Chickens, Merchie's Big Blow, and other mines obtain their supply from surface tanks, which were filled from a thunder shower about 10 or 12 days ago, and the Leadville district is sufficiently supplied with fresh water obtained as soakage in three distinct creeks at only about 3 feet sinking. As far as other parts of the range are concerned I uphold that even a footman can, with the assistance of a water-bag, travel from one end to the other of the whole length of the barrier. The track from Terowie is good. Water can be obtained at all stages, never exceeding 20 miles at the outside. Messrs. M'Gowan and Rayner are running two coaches weekly from Terowie, and will put on more as soon as they have a sufficient supply of horse feed carted along the line. As regards the health of the inhabitants it may be said that it could not be better; indeed, there is no sickness of any kind in any part of the range. We have a medical officer on the field, who came up some two months ago, but up till now he has been almost on the list of the unemployed. Provisions are plentiful, and reasonable in price. Horse feed is also plentiful, and is retailed at 7s. per bag at Silverton."

The following is the return of tin ore received at Newcastle and Morpeth for the week ended March 8:—From Armidale to Newcastle, 7 tons 19 cwts.; Uralla to Newcastle, 7 tons 12 cwts.; Uralla to Morpeth, 31 tons 6 cwts.: total, 46 tons 17 cwts.

The following is a return of copper received at Darling Harbour Station for the week ended March 1:—From Nyngan, 247 tons 10 cwts.; Orange, 13 tons 10 cwts.; Whitton, 1 ton 9 cwts. 3 qrs.: total, 262 tons 9 cwts. 3 qrs. For the week ended March 8 the quantity was 169 tons 10 cwts. 2 qrs., of which there was—from Nyngan, 107 tons 3 cwts. 2 qrs.; Orange, 11 tons 2 cwts.; Old Junee, 2 tons; Whitton, 10 tons; Esk Bank, 36; Carrathool, 3 tons 5 cwts.

Sydney, March 20. R. D. A.

THE TRANSVAAL GOLD FIELDS.

SIR,—In last week's *Mining Journal* you publish an extract from the Cape Times relative to an article I wrote for the Pall Mall Gazette of Jan. 30 on the Transvaal Gold Fields. I need scarcely say that generally the paragraph in question is as untruthful as it is malignant. It is, however, quite possible that in consequence of the Cape being a wine-producing country the writer's memory may be a little treacherous. My report to the Government on the auriferous character of the Knysna was published more than five years ago, and to show you and the public the opinion the Cape Times then entertained of Mr. Kitto's report, I attach a clipping from a leading article which appeared in that valuable paper of March 5, 1879, and without exception the same sentiment was expressed by every newspaper in South Africa:—"There is a gentleman now in the country whose Australian and Californian experience, not as a mere miner, but as a discoverer of mines, might render his services very valuable in unearthing the mineral wealth of this country. The report of this gentleman on the Karatara gold district was a document bearing the impress of training and experience. In that report there was no jumping at conclusions, no concession to the popular appetite for great expectations, no trace of hasty generalisations drawn from the observation of others. At Karatara, we believe, very little gold has been found yet, and in this respect Mr. Kitto's judgment is verified, for he does not expect that any quantity of gold will be found there except by means of an expensive working which put Karataras out of the field as a poor man's digging. But the colour of gold is extensively found over this country, and we submit that it would be a fair venture on the part of Government to give for a definite period a roving commission to the gentleman who reported on the auriferous deposits of Karatara. There may be alluvial gold in quantity somewhere at no great distance; and, at all events, as the indication of gold abound a little money spent in ascertaining the meaning of these indications would be well laid out." It would be impossible to write in more flattering terms of any mining man. And I have no doubt the change which has since come over the spirit of the Cape Times is owing entirely to the publication of those unpalatable though honest reports of mine which prevented the enriching of a certain set of South Africans at the expense of the English. As to the known gold fields of the Transvaal their present non-success is owing entirely to the inauguration of a system that is in no way adapted to the requirements of the place, and whatever may be the value of the present gold fields I know of very extensive tracts of country in the Transvaal which, in my opinion, are much better. When I wrote—"The Transvaal will never be a great gold-producing country as compared to Australia or California," it was in reply to the various reports which stated "they were the richest gold fields ever discovered in the world." I distinctly pointed to half-a-dozen places that would pay very well if properly conducted, but I regret to say they are not being properly conducted, and consequently they are not likely to pay very well.—*Gunnersbury, April 28.* THOS C. KITTO.

VICTORIA GOLD COMPANY.

SIR,—One of the directors (Admiral Powell) went out to the mine to see the state of affairs and to report the result of his personal inspection, so as to inform the shareholders as to the prospects of the undertaking. I am informed that the directors agreed to pay Admiral Powell 500*l.* of the company's money for his journey and report.

A telegram purporting to have been sent by Admiral Powell saying "the mine is rich" was sent to the shareholders with the promise of a full report from him immediately on his return, but although months have elapsed since the Admiral's return no report has yet reached the shareholders. It would be interesting as well as satisfactory to the shareholders to have Admiral Powell's report in reply to the letter of "C. G. C.," which appeared in the *Mining Journal* of April 5.—*Harleaden, April* 25. ——— W. S.

COAL IN THE COLONY OF VICTORIA, AUSTRALIA.

SIR,—As promised I forward herewith a copy of the report I referred to in my letter on this subject in last week's *Mining Journal*.

Chester-le-street, April 29. A. J. G. SWINNEY.

The Secretary for Mines for the above colony has received two reports upon coal prospecting from Mr. R. A. F. Murray, Geological Surveyor, in which he states:—With respect to the proposed boring operations in search of coal in the Geelong and Winchelsea districts, the first of these is at Portartington, where there is an exposure of the carbonaceous rocks near the Old Flour Mill, and where water for the drill can be readily conserved or obtained at a shallow depth in an adjacent flat. One deep bore here would, I consider, fully set the question at rest so far as the Geelong and Bellarine district is concerned. The second site is about seven miles south from Winchelsea, on a reserve at the junction of Parlour Gulley with the Wormbete Creek. The exposed rock layers are nearly horizontal, tolerably regular, and if there is coal at all in the sub-adjacent layers the locality recommended is, in my opinion, the most likely in which to discover it. I inspected the coal seams recently exposed in shafts sunk under the direction of Mr. Aug. Eyre, in the Strezlecki ranges, 12 miles north from Anderson's inlet. When I examined it nine years ago only the exposure in the creek bed was available for inspection, and the section was as follows:—

Surface soil, clay, and rotten shale	4 ft.	0 in.
Coal	0	8
Soft earthy shale	0	11
Coal deteriorated by exposure	2	9
Coaly shale	0	3

ON SANDSTONES AND SHALES.—On the occasion of my recent visit I found that two shallow shafts had been sunk, and had cut the coal seam. Subjoined are the measurements taken at the four corners of this shaft, which is 8 ft. long and 5 ft. wide:—

	Ft.	In.
North-East Corner—		
Surface rubble and shale	3	0
Coal, decomposed, but likely to prove good if followed into solid ground	1	0
Greyish-yellow rubbly shale	2	5
Coal, good	0	8
Grey shale	0	6
Coal, top portion (6 in.) shaley, but lower portion (18 in.) very good	0	2
North-West Corner—		
Surface rubble and shale	3	0
Coal (as in North-east corner)	1	3
Rubbly shale	2	1
Coal, good	0	8
Shale (lower portion of 5 in. almost coal)	1	4
Coal, very good	1	2
South-East Corner—		
Surface soil, decomposed edge of upper seam and shale	4	6
Coal, good	0	8
Shale	0	6
Coal, top part (4 in.) shaly; lower part (14 in.) good	1	6
South-West Corner—		
Surface soil, decomposed edge of upper seam and shale	4	6
Coal, good	0	9
Shale, coaly	0	6
Coal, very good	1	7

The lower portion of the coal, from 14 to 19 in. in thickness, is of great excellence—hard, clear, bright, and burning well; it is an excellent steam and household coal, and appears superior in heating power to New South Wales coal.

The second shaft is about 1½ mile south-east from the first to the south of E. L. Smith's section on the bank of a creek flowing south-eastward, and is 5 ft. deep, showing a thickness on the bottom of from 24 to 27 in. of coal. There are a few thin irregular clayey partings, and the coal is deteriorated owing to its exposure; but I have not a doubt that if followed into the hill it would be found a thoroughly good marketable coal. It is nearly horizontal, and appears to be the same as the main seam in the other shaft. The indications afforded by the above-described exposures are as promising as, if not more so, than those of any other known occurrence of coal in Victoria. The low-lying position and nearly horizontal bedding of the coal justify the supposition that it will be found to extend beneath a wide area, especially to the north, south, and west.

I have no hesitation in recommending the thorough testing of this part of the country, and in expressing the opinion that properly directed efforts in this direction are likely to prove successful. Independently of any statements respecting the bore already put down, there is a fair likelihood of other seams being found underlying those exposed, and this locality being in a nearly central portion of the carbonaceous area, there is also the probability of such seams here attaining their greatest thickness.

MEXICAN MINING, AND MINERAL RESOURCES.

SIR,—In course of reading I have just come across a book published in London in 1881, entitled A Treatise on Metalliferous Minerals and Mining, and although the work is a very good one of its class, its statements with regard to this country are, to say the least, very misleading. I have not the slightest wish to injure the reputation of either the author or his work, but only desire to correct, and at the same time give some information on this country which he may have found difficult to obtain in the past.

SILVER.—With regard to silver mining the author writes at great length on the Comstock lode in California, and gives the total yield of this rich lode since 1859 at 70,000,000*l.*, while only eight lines are devoted to the silver veins of this country, and these are so erroneous as to induce me to correct them. The Rosario lode, on which are the mines of Guatamocsin, Rosario, San Nicholas, and Porvenir, have yielded since the year 1854 over 30,000,000*l.* worth of silver. This lode is situated near the city of Pachuca, in the State of Hidalgo. Then, again, there is the famous La Luz Mine, in the State of Guanaxuato, which has yielded to date over 20,000,000*l.* worth of silver ore. Probably the richest silver lodes in the world are to be found in this State (Hidalgo), and I venture to assert that this district, including Real del Monte and El Chico, has yielded more silver than any one district in the world, and yet the author passes it over in comparative silence.

COPPER.—The author completely ignores the existence of this mineral in this country, and yet there are many rich copper lodes to be found here, notably the Flojonales Mine, near Zimipan, in this State, which is worked by an English company, has a lode of copper over 70 ft. wide, with an average yield of about 22 per cent. pure metal. This lode is worked by an open-cut in the side of a mountain.

IRON.—Again the author does not mention this mineral as occurring here, but at Encarnacion, State of Hidalgo, there are literally mountains of iron ore. An English firm have established an iron-works at this place for some years. Practically speaking there is no limit to the iron ore beds or deposits of that place, there being, as I have just stated, mountains of this mineral of the richest class extending over an area of more than 20 square miles.

COAL.—This mineral (if it may be so called) is also unmentioned by the author as occurring here, and yet the coal beds of Zacualtipan, State of Hidalgo, are of well-known importance.

MERCURY has also shared in the general obscurity of the work, but in the State of Puebla many rich lodes of sulphide of mercury (cinnabar) are being profitably worked.

TIN.—The States of Durango and Zacatecas contain many very rich lodes and alluvial deposits of this mineral, although the author does not state it, and as soon as the different railways now in course of construction are completed will be profitably worked. The cost of carriage to a seaport has been a great drawback hitherto, but this is quickly disappearing as the railways are being built.

Pachuca, March 29. ——— FRED. W. BAWDEN, M.E.

MINING PROGRESS IN VENEZUELA.

SIR,—I fulfil my promise to send you occasional information of the various English companies in Guayana, and shall devote the present letter to the Chile Gold Mining Company. The secretary of this company has been in Guayana, and appears to have made a close observation of all matters pertaining to the Chile Company. He has returned to England, and no one is yet aware of his opinion of all that he has seen; but his appearance and reputation must belie him if he returns otherwise than highly satisfied with the flourishing and promising state in which he found everything, and the able manner in which Mr. Nicholson has succeeded in making a valuable concern out of the mere name which only the property had ere he assumed the reins of its management.

Persons in Guayana, who happen to have known what a few years ago formed the Mocupia and New York Company, cannot but wonder at the metamorphosis it has undergone under the very able direction of Mr. Nicholson. It must be very gratifying to this gentleman to observe the success which has attended his assiduous efforts to bring the property to its present state, perhaps at the risk of his health, for it must require unusual powers of endurance, &c., to be able personally besides other duties to audit all the accounts of the company, make surveys, direct the working of the mines and mill, carry out engineering designs, &c.—in fact, devoting to every department an equal amount of supervision and attention.

In conclusion, I may state that the Chile Company is on an undeniably prosperous march, and as soon as the mining and other departments are completely developed, as they very much needed to be, the patience of the shareholders will be rewarded in the possession of a property in thorough working order, and second to none in the country. This is generally the fruit of such an extensive scientific knowledge and practical experience as Mr. Nicholson undoubtedly possesses, for to-day he has the honour to be one of the leading authorities in mining and engineering matters in Venezuela. My next letter I shall devote to the Potosi Company. W. W.

El Callao, Venezuela, March 11.

VENEZUELAN MINES, AND ENGLISH COMPANIES.

SIR,—I subjoin a copy of a protest that I have been obliged to make in this country against certain actions taken in London or in Paris, relative to concessions known here as Austin's No. 1 to No. 10. The same protest is being published in the Bolivarense and La Opinion Nacional of this country; and I send it to you for publication, so that your readers who may take interest in the matter may not be beguiled by false reports. ALBERT H. NICHOLSON,

Superintendent of the Chile Gold Mining Company.

Chile, E. U. de V., March 27.

[COPIA.]

Alberto H. Nicholson, subdito britanico, mayor de edad de este vecindario, como dueño de la Concesion minera denominada "T. B. Austin No. 9," segun lo demnestran los documentos que me han sido otorgados y pueden verse en el Registro Publico del Distrito Roscio, i tambien como Representante legal en este Territorio de la Compañia Inglesa Guayana, Limitada, hago constar. Que protesto solemnemente contra la venta celebrada por el Señor Hilarion Gambus, vecino de Ciudad Bolivar como apoderado del los Señores Michael Georges Mabrogordato y Parasqueva, George Scheare, vecinus de Londres, representantes a su vez de la Compañia llamada "Sindicado de las Minas de Oro de Nacupai" referente, la espresada venta hecha a una neuva Compañia llamada, "Nacupai Gold Mining Company, Limited," a las concesione mineras llamadas "T. B. Austin, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, y 10," constante cada una de cuarenta minas. Consta en el Tribunal de Primera Instancia de este mismo Territorio, que la compañia denominada "Sindicado de las Minas de Oro de Nacupai," de la cual son representantes los espresados Michael Georges Mabrogordato y Parasqueva, George Scheare, y que es la misma que hai vende per medio de Apoderado a la neuva compañia indicadaya, las precitadas concesiones "T. B. Austin," des de el uno al diez inclusive, carese en Venezuela de representacion legitima: Asi ha sido resuelto por el Tribunal; o lo que es igual se considera inexistente para ejercer en la Republica derecho Civil y mientras esa sentencia este pendienta en los Tribunales de Venezuela, mientras no se resuelva lo contrario, todo traspaso, toda venta que efectue, todo derecho que transfiera la espresada Compañia "Sindicado de las Minas de Oro de Nacupai," sobre las espresadas Concesiones "T. B. Austin, del uno al diez, es nula, es ineficaz y de ninyun valor; mas como por otra parte la vente a que vengo refiriendome, hiere mis interesez personales, como dueño que soi de la Concesion "T. B. Austin, No. 9," y tambien de la Compañia Guayana, Limitada, a quien representa, para dijur a salvo ambos derechos, me corresponde protestar, como protesto solemnemente, cuantas veces fuere necesario, contra quien haya lugar por la mencionada venta efectuada por Hilarion Gambus, como apoderado de los representantes de la llamada, "Sindicado de las Minas de Oro de Nacupai," en favor de la nueva Compañia "Nacupai Gold Mining Company, Limited," y registrado con fecha Ocho del mes corriente; haciendo estensiva esta Protesta a cualquiera otra transaccion que se celebre a se haya celebrado con relacion a las espresadas concesiones "T. B. Austin, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, y 10." Asi lo digo, atorgo i firmo ante testigas, en Guasipati a veinte y dos de Marzo de Mil Ochocientos Ochenticuatro. (Firm.) A. H. Nicholson. Testigo, Guillermo E. Mönch. Testigo, Emilio Unshelm.

Territorio Federal de Yuruary.—Oficina Subalterna de Registro del Distrito Roscio. Guasipati Marzo veinte y dos de Mil Ochocientos Ochenta y cuarto. El presedente documento ha sido presentado leido y firmado ante mi para seo registro, por su otorgante Señor Alberto Henrique Nicholson, de cuyo conocimiento doi fé, mayor de veintiun años y vecino de este Distrito siendo testigos de este acto los Señores Guillermo Eugenio Mönch y Emilio Unshelm vecinos que tambien le conocen. Quedu registrado por mi, por el Otorgante, i por los testigos referedos, bajo el numero once, y a los folios quince y diez y seis del Protocolo numero cuarto, correspondiente al primer trimestre del Corriente año 1884, en cuyo duplicado se han inutilizado conforme a la Ley cinco Bolivares en Estampillas. Sellado con el Sello de la Oficiana. El Registrador, T. Machado Nuñez.

Examined and approved—ALBERT H. NICHOLSON.

AUSTRIAN GOLD AND SILVER MINES.

SIR,—Since I last wrote you on this subject I have seen the report of Berg Director Herr Carl Rochata respecting the mines in Ober Kärnten (Die alten Bergbaue auf Edelmetalle in Ober-Kärnten); the account of their past history is most interesting. I fear I shall hardly do justice to Herr Rochata's historical account; still, as Austrian mining is engaging much attention just now I venture to ask you to insert a short notice of the same as a prelude to the account I shall, if possible, furnish you with of the district I am anxious personally to inspect. Herr Rochata remarks that the history of these mines constitutes in reality the history of the country and its inhabitants, and goes back to remote antiquity, mining having formed from the earliest date a most important part of the industry of the Province of Upper Carinthia. Still, it must be admitted there is much dearth of early information—even that of the 14th, 15th, 16th, and 17th centuries is defective and traditional, making a comprehensive treatise of the rise and development of mining impossible—an endeavour to convey a general idea is alone practicable. The Tauriscan and Pisoutian inhabitants of Noricum, knowing of the gold veins, took advantage of them, as well as of the gold washings in the rivers and streams. The poverty of the soil in the district rendered it impossible to live by its cultivation, and in time mining for the precious metals formed, if not the only, the chief, employment in the district.

The metallic veins in almost all cases cropt out on the surface, and much of the gold was obtained from soft argillaceous matter found in proximity to these outcrops, and it is almost unnecessary to say most primitive tools were employed, not only at Kärnten, but at Salzburg. Traces of stream works for gold washing are to be found carried on probably by the Romans, if not by a native race prior to the Roman incursion. These workings were extremely numerous, but have all been washed away, and all traces of them destroyed by glaciers or lie buried under the masses of rock debris which this ice agency has borne down on them. Passing over the Fuscher-Rauriser and Hl. Bluter-Tauern pass, from Salzburg to Möllthäll of C. Kärnten, the road leads into the gold ravines of the Tauriscan mountains, the Pasterze, the Clew, the Gold-guild, the Monkberg, &c. From the mineral baths of Gastein the way leads past the valley of Böckstein through the Aulouf valley over the Wimmer-Alp and the higher and lower Felder-Tauern, or Corn-Tauern, into the Mallitz vale to Kärnten, and from there into the Möllthall. Even at the present day vestiges are to be seen on the northern side of Tauern of the ancient Heiden-weg (heathen temple), 7 metres wide, consisting of large blocks of granite brought probably from Thalesteife, supported on walls of masonry, and though in ruins (few remnants being found) it still impresses us with the idea that it was originally a gigantic work.

There is also a road out of the Drauthole of Lontiom over Iselsberg to the Möllthall, were still exists a portion of an ancient paved way. Even though the more scientific construction of the roads should be Roman it does not prove that they were the original makers of them; there was commerce with Italy, and from the fact that the Romans conquered the whole of this territory in one year, and that the Celtic towns of Noricum had active communication one with the other it may be argued that these roads existed before our historic period. Two hundred years before the Christian Era the Italians roamed over the district, and worked with the Barbari (natives); the Tauriscans sought in vain to rid themselves of their unwelcome visitors, but the news of the mineral wealth had spread, and the "cursed thirst for gold," which Jugurtha found so rife in Rome, was the means of reducing the free Tauriscans to a state of slavery. Little of interest has been preserved respecting the independence of the Noricans. The names of places have become changed, which renders it impossible to recognise their origin. Superstitious legends still linger in the land, and at quite a late period there their existed a belief in mountain and earth spirits, protecting women, wicked gnomes, and dragons, while Nature's laws were disregarded and unknown. In this district of Carinthia there are but few stone inscriptions to be found in which the preservation of the Celtic names together with the Roman proves the mixture of the two races, if we except that transferred from Lazins to Ober-Vellach (L. Aquilius Narcissus Bel. August. Lib. V.F.); that states that L. Aquilius Narcissus erected a temple to the Keltic god Bellenus, who personified the sun. We find in its ruins a temple consecrated to Hercules, the guardian of subterranean treasures, and who came over to the Kelts as early as the Romans from the land of the Greeks.

We preface the description of the Roman rule in the Alpine districts of Noricum with an account of their monuments in order to show the intimate admixtures of the Celtic race of the Tauriscans with their subsequent liege lords the Romans in manners, religion, and mode of life. It would be too tedious here to relate all the incidents relative to the Roman occupation of the gold-producing valleys of the Tauern. First, no doubt, they went as speculators or traders. The Romans called the Noricans their allies in the war with the Cimbri and Teutones, and Julius Cæsar first made the road over the Plöcken practicable in order to chastise the Pyrustes, procuring from these districts auxiliary troops called Söldner, in the 15th year before Christ, or in the 739th year after the building of Rome.

The Tauriscans ceased to be a free people, the rich gold mines yielded up their wealth to the chests of the Arcarians, and the inhabitants of the Alps, possessing only their flocks, paid tribute, whilst in the beautiful valley Roman villas were erected, and on the surrounding hills temples were built to the gods of the land which had now become Roman. Many of the homeless inhabitants of the country took refuge on the heights of the Tauern, hence the tale of heathen caves and of the wild women of the mountains, who are said to have robbed the noble families of their children. Alas! ruins alone remain of Roman villas, Roman temples, and Roman splendour. Romans of noble blood settled here, became revenue farmers and leaseholders in these lucrative districts, or obtained public employment. At Lazius, in the county of Ober-Vellach, a stone inscription was found with the seals—"Chaeronti, Aug., N. Disp. Rat. Cop. cop. Exped. Fel. II. and III. Germ.," which refers to the auditor of a Norie treasurer, and to the expeditions out of these countries into Lower Germany. There is also in the same district a tombstone with the inscription—"M. Marius C. T. August. L. Vitus. sibi et C. Mario, Fratri." Also among the few existing ruins there deserves to be mentioned an inscription discovered running thus—"Laudibilibus Comitibus et An—Un Ci. Opti, et sibi." The seals laudibilibus comitibus refer unquestionably to the counts of the mint or metals residing in Teurnia, and therefore at the outlet of the Möllthall, proved by the order issued in the year 365 by the Emperior Valentine I. to the Illyrian "comes metallorum," wherein he gives him the title of "laudabilitas sua." There is also a stone inscription near Ober-Vallach which mentions a member of the Collegium Centuriatorem, an armourer named Longius Patroclus. It is probable that this company not only employed themselves in sharpening swords, but also in making and repairing instruments for boring and hewing in the mines.

The settlement of Romans, domiciled legionary soldiers, tributary natives, and enslaved miners were numerous, proved by the proximity of Teurnia, or Liburnia, to the field of the same name at the confluence of the Drau and the Möll, in one of the most beautiful districts of the upper country. Virunum had, by its position and by its constant increasing elegance and culture, a decided advantage over the mountain city of Teurnia; yet this latter raised its head in the latter period of the Roman rule, and resisted the incursions of the barbarians. It foundations are still to be seen. It still existed after the devastating expedition of Atilla, the king of nations; and Eugippus, the faithful biographer of St. Severinus, mentions it in the second half of the fifth century as the capital of middle Noricum and as a bishop's see, and calls the inhabitants Burgesses. All this, no doubt, will be considered by many very dry stuff, and to have very little connection with gold mining. Next week I hope to send you further extracts, when, I think, your readers will acknowledge that Herr Rochata's historical account of the gold and silver mining of Ober-Kärnten is not only instructive, but intensely interesting.

Preston, April 30. ——— F. KENSINGTON.

TIN MINING—GREAT WHEAL VOR DISTRICT, AND MINES THEREIN.

SIR,—Great Wheal Vor is about 300 fathoms deep on a lode that yielded about 4,000,000*l.* worth of tin ore, and paid in the last working 270,000*l.* in profits, no record of former dividends being known; it may, therefore, be set down as one of Cornwall's great mining prizes.

Wheal Metal joins Great Vor on the latter's south boundary, is between 200 and 300 fms. deep, sold about 600,000*l.* worth of tin ore, and paid 100,000*l.* in dividends. The lode towards and at the bottom is, it is said, split up, and also that the main engine-shaft collapsed (gone together). It will require a very large capital to drain and place this mine in proper working order, and if the lode is poor at the bottom (being the reason stated for its stoppage) there can be little or no prospects of this mine ever becoming profitable, and in my opinion it had better remain idle.

Trueman's.—This mine is the next to and adjoins Great Vor on the north, and like Wheal Metal and Polladras Downs was worked by the Great Wheal Vor Company; it is only about 60 fms. deep. The lode is from 8 to 50 ft. wide, from which the above-named company could always depend on getting a supply, and although no separate accounts were kept for Trueman's I have obtained sufficient information to enable me to say the result of the returns gave some thou-

sands sterling in profits, when black tin was at a much less price than now. There are three other lodes in the sett on the north and parallel to Trueman's; also the cross-courses that no doubt produced the great riches in the celebrated mines—Great Vor, Metal, Polladras Downs, Wheal Gwins, Great Fortune, and Great Work.

I have wondered for several years past why Trueman's is not at work. I suppose it is because mining is dull, owing to so many worthless bubbles, some of which have and others will in a short time collapse. I am informed Trueman's is under grant, and I strongly advise its being set to work without delay. It is undoubtedly one of the few known best tin mines in Cornwall, and it cannot fail to be very remunerative. Having mentioned Wheal Gwins and Polladras Downs, with your permission I will more fully explain their position and prospects in a future letter. What puzzles me is why such well known tin mines as these are not in full work.

April 24. ——— HENRY H. HESTER.

COLLIERY EXPLOSIONS, AND SAFETY-LAMPS.

SIR,—I note an extraordinary statement in the *Mining Journal* of April 12 under the head of "Trade of the Tyne and Wear," that in your correspondent's long experience, extending over 40 years, he had never met with an explosion from either the Davy, Clanny, or Stephenson lamp. If such a statement were fact* we may well ask why should we have such excitement throughout the country *re* safety-lamps, or such an elaborate series of experiments by a Royal Commission? The explosion at the Fair Lady Pit, Leycett, and a case stated by the Chief Inspector of Mines to the Manchester Geological Society amply refute such a statement.

With regard to the Routledge lamp the idea of air passing between the glass and the gauze is not new, as the ordinary Jack Davy lamp has the same feature. Unfortunately the plunging of a safety-lamp into an explosive atmosphere is *not* a crucial test. M. E.

Derby, May 2.

[* "M. E." is too hasty, he even dates his letter May 2, though he posts it on May 1, and does not read carefully. The statement to which he objects is contained in the usual weekly letter of one of the district correspondents of the *Mining Journal*, who is a colliery engineer of long experience, and certainly not untruthful, as "M. E." infers.]

LEAD ORE, AND PROTECTION.

SIR,—Some of your correspondents, "Saucius" amongst others, are much exercised in their minds about lead and its prospects. I have very clearly pointed out in your columns what the evil is and where it lies, as also the simple and only remedy for it. "L. D. R." is quite right in failing to see anything disastrous in a rise in the price of lead. The working classes are indeed affected by the low price of lead. They are ground down in their wages as lead miners, or are driven to foreign countries, in order that the well-to-do classes may get their lead at the very lowest price, and in order that foreign lead mine owners may get the profits and their workmen the wages, which the owners of our home lead mines and their miners ought to receive. Union is power, and a union of the mining interests of the kingdom, with a determination to obtain a fair protective duty against the importation of foreign lead, is the only rational method of proceeding.

No regard need be paid to the abject whinings of those who cry "Protection is dead and buried," or "A return to Protection is impossible." Protection is in force in France and America, and these countries thrive and distance England in the race of commerce in spite of the ravings of the political mule, John Bright, that fossilised upholder of a sham doctrine, which he is pleased to call Free Trade, and he is as fond of and as devoted to his venerable craze as a doting mother is to the scapegrace of her family. No one would lose by an advance in the price of lead except those who can well afford to put a fair price for it.

"L. D. R." has I fear studied lead statistics and all information to very little purpose, when he says he can see no cause for the price of lead being so unremunerative. The cause is before his eyes, and staring him in the face; and is the free untaxed importation of foreign lead. Is he lead blind, or inaccessible to facts occurring round him? Lead will go lower yet, and cutting down of wages, reductions of lords' dues, and improvements in machinery and manipulations are all in vain to stem the tide of cheap foreign lead which our paternal statesmen see fit to suffer to progress ever from bad to worse. "Saucius" says the persistent depression in lead has been attributed to Free Trade, unfair trade, and foreign competition. Is not "Saucius" aware that these three causes are one and the same? They each mean free admittance for the lead of all foreign nations into England, robbing our mineowners of their profits, and, therefore, of their power to employ labour, and our miners of their wages, and, therefore, of their means of livelihood.

Ignoring the simple fact that the free importation of foreign lead in quantities only limited by the demand as clearly accounts for the low price of lead as that drinking is the cause of drunkenness, "Saucius" thinks he has discovered what he calls the true cause of the depression of lead. Is it because lead has been displaced by galvanised iron and iron piping? If so the more reason that foreign lead should be shut out from the home market; but lead is still consumed, and to a greater extent than it ever was before. I see, for instance, iron piping pulled up and replaced by lead for gas purposes. Shut foreign lead out of England and a season of prosperity for home mine owners and their men would at once set in, such as it is vain to expect under present circumstances. When the effete, doting, reasonless Cobdenites are dead and buried beyond recovery Protection—that is, just protection—will rise up in renewed vigour, and will defend the British working classes against the foreign banditti let in now to tread our working men under foot, and to impoverish the true wealth of the nation, for that wealth lies in the full employment of its working men in useful industries and at fair wages. Are we to grind the faces of the poor men because the infidel Mill has taught that the wealth of a nation augments in proportion to the cheapness of all commodities. It is an undeniable fact that as commodities are cheapened profits are cut down, and, therefore, wage-paying power; and if the political economy dreamers could only push their idiotic craze to its limits they would cut down profits altogether, and so destroy the power of paying wages. What then becomes of the working men? Are they to divide the residuum of a bankrupt nation amongst themselves? Protection, just protection, relieving all suffering trades, would bring wealth and abundance in its train.

It is true that the horrible and atrocious iniquity of the liquor traffic unless put down as it ought to be with a strong hand and relentless determination will always hang like a millstone about the neck of England's prosperity; but it may be hoped that the efforts of England's true friends may at last induce our countrymen to free themselves from the fetters of the vilest slavery that ever sunk the souls of men and women to perdition, the slavery of intoxicating drink, and the licensed lawful but most awful traffic in that God accursed narcotic which, says Mr. Gladstone, is more fatal than war, famine, and pestilence combined. He and his Government are, however, guilty of more blood in delaying Local Option than they are said to have been in Africa by their blunders. Not less than 120,000 of our people are cut off annually, slain of drink and by their rulers, who deny them protection against it. RECIPROCITY.

ELECTRIC RAILWAY BILL.—The Select Committee of the House of Commons yesterday resumed its consideration of the London Central Electric Railway Bill. Mr. Bidder, Q.C., and Mr. Moulton again appeared for the promoters; and Mr. Pope, Q.C., Mr. O'Hara, and Mr. Cripps for the petitioners against the bill—the Metropolitan Board of Works. Mr. Robert Vigers, called for the promoters, said he was a surveyor and valuer, and having made the necessary examination, he was of opinion that the estimate for the undertaking was quite sufficient. The railway, if constructed, would develope a large traffic, and be of great public service and accommodation. This concluded the case for the promoters, and Mr. O'Hara, addressing the Committee on behalf of the petitioners against the bill, said they did not oppose the passing of a bill for a line from Waterloo to Charing-cross—let that experiment be made; but what they said was that they had no right, until that experiment were proved to be a success, to allow this company to utilise surplus land, purchased at considerable expense by the Metropolitan Board of Works, and of which is was their bounden duty, as the trustees of the ratepayers, to make the best use they could. Several witnesses having been examined for the petitioners, the committee decided the preamble had not been proved.

THE MISSISSIPPI RIVER DURING THE GREAT RIVER AGE—No. I.

BY J. W. SPENCER, M.A., F.G.S.

Professor of Geology, Missouri State University, late Vice-President of King's College, Windsor, Nova Scotia.

During the special study of the origin of the great lakes of this continent I was led outside of the immediate field of research into the consideration of the ancient Mississippi, which resulted in a lengthy chapter, written during my residence at King's College, Nova Scotia, in the spring of 1881. In the present paper it is my purpose to bring together the more important observations bearing upon the structure and development of the Mississippi river, which culminated during the Great River Age, at the close of the tertiary or beginning of the quaternary period, as a contribution to the yet imperfectly unfolded science of fluviatile geology.

THE EARLIER MISSISSIPPI.—Upon examination of the geologic structure of Minnesota and Wisconsin we find that the primary streams of the great river are largely derived from the archæan formations of these states. As the growth of the American continent was southward from the great laurentian belt of Canada and the region of Lake Superior, we should naturally expect to find the most ancient river valleys along its margin, where the subsequent palæozoic formations do not cover all of the more ancient river beds. Some of the valleys now tributary to the Mississippi system date back to near the commencement of the palæozoic time. During a recent visit to the falls of the St. Croix, in company with several members of the American Association, one of my first observations was that of the most ancient river valley which I had ever visited. At this locality the St. Croix Valley cuts through the copper-bearing series to a depth of 200 ft. or more, but portions of it are still occupied by almost horizontal (primordial) sandstones, which subsequent to its original excavation were deposited in it.

Accepting the age of the copper-bearing series as lower cambrian, and all the Potsdam sandstones of the region as belonging to the upper cambrian series, we see that the valley dates back to about the middle portion of the cambrian period, though occupied by later deposits of that great system. With regard to the valley Mr. Chamberlain is of the opinion that it may have been either a primordial river bed or a channel worn by the encroachments of a primordial ocean. Between the Upper St. Croix and lower portions of the same river there is a great slope along the bottom of the valley, which is generally excavated out of rocks of the copper-bearing series, though intervening portions of the valley are occupied by almost horizontal Potsdam sandstones. As the continent was not largely developed during the cambrian age the drainage of the archæan highlands and the basin of the western end of Lake Superior was naturally more or less removed by the ancient St. Croix into the adjacent sea to the southward.

During the later cambrian days the whole region was again submerged, and it was only after the deposit of the Potsdam sandstones that the region again became elevated, and the St. Croix began to re-excavate its valley, which has ever since continued to exist, with, however, some disturbances during the pleistocene epoch. This cambrian St. Croix Valley may be taken as the type of other very ancient river valleys, which in early times contributed their waters to aid in the first production of the Mississippi river. Though many streams of Wisconsin and Minnesota are now flowing over archæan rocks, it is seldom that the date of the origin of their valleys is apparent.

With regard to the development of the great river during the palæozoic times but little is known. Originally made up of many cambrian streams from the northern hills its magnitude increased with each successive elevation of the continent, bringing to the surface silurian, devonian, and carboniferous formations, until the close of the palæozoic days, when a great river had been produced (partly by gradual extension and partly by a union of various pre-existing smaller valleys), discharging into the embayment of the Gulf of Mexico, then reaching northward as far as the mouth of the Ohio, which river also discharged its waters directly into the extended gulf. At this period of its history the Mississippi river received many tributary streams from the Northern States, and even the lower reaches of the Missouri river then paid tribute to the "father of waters." The genesis of the Ohio river was not until after the Appalachian uplifts, closing with the palæozoic time, although portions of the river flowing over silurian rocks of the Cincinnati Arch were doubtless in existence at an earlier date.

Throughout the mesozoic time the river did not leave any record of growth, for the embayment of the Gulf of Mexico was not obliterated until the close of the eocene epoch, when it became entirely filled, forming the northern outline of the shores of the gulf, nearly parallel with those of the present day, exclusive of modern delta deposits. Consequently the Mississippi, below the region of the mouth of the Ohio, excavated its preglacial valley, about 500 miles in a direct course (although the modern meandering river in alluvium deposits is more than twice that length), out of the soft eocene strata during the middle and later tertiary days,

THE MISSISSIPPI VALLEY BELOW THE JUNCTION OF THE OHIO.—The Lower Mississippi river flows through an alluvium bottom from 40 to 80 miles or more in width, bounded by tertiary or quaternary bluffs, and traversed by some long ridges (as Crowley's Ridge, which is composed of orange sand) of pleistocene deposits. The tertiary strata of the south are overlaid by the orange sand or southern drift of Hilgard, and this is again overlaid by partly marine and partly fresh water clays and sands of the Port Hudson group, which is followed by the loess. These deposits underlie more or less generally the alluvial beds, and an acquaintance with their occurrence or absence will afford some knowledge of the former development of the great river.

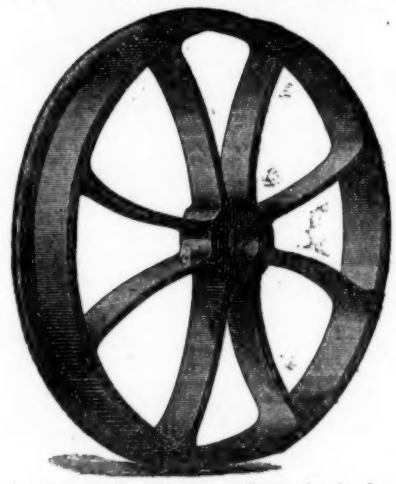
In 1856 an artesian well was sunk at New Orleans; subsequently Prof. E. W. Hilgard examiined the records of the boring and the shells which had been brought to the surface. Although there was some question of the exact age of all these deposits to the depth of 630 ft. Mr. Hilgard considers them as pleistocene, there being present only four species of minute shells which are not now known to occur in the gulf. The upper 31 ft. he places as modern river alluvium, and says that nothing could properly be considered as river silt below 108 ft. Mr. Hilgard records the occurrence of the Port Hudson group as reaching to a thickness of 354 ft., underlaid by 96 ft. of orange sand, at Calcasieu, 200 miles west of New Orleans. He further remarks that it is not at all surprising that the Port Hudson group should not be passed through at 630 ft. in the greatest channel of the world. This well does not pass through the strata which elsewhere corresponds with orange sand. On examination of the soundings of the Gulf of Mexico and the borings along the river one is led to accept Mr. Hilgard's views as to the age of the deposits through which the New Orleans well was bored.

SOUNDINGS IN THE GULF OF MEXICO.—The modern sediments in the Gulf of Mexico naturally obscure the ancient channels which exist near the coast. After passing the contour line of 10 fms. it is observable that the lines of the contour of the bottom of the gulf approach the present coast of Barataria Bay. To the westward of this meridian the 100 fathoms line is not less than 50 miles from the coast, and is very regular. After passing eastward of the delta it is still farther to the southward; but southward of Barataria Bay the 100 fathoms contour approaches 25 miles nearer the shore, and forms a loop-like line, representing a gradually expanded mouth of a river. This appears to me to represent the former channel of the river, as it is in a direct course with the principal axis of the great Mississippi Valley, from which the present channel is evidently a deflection. This submerged channel is indicated by the recession of all the contour lines of the gulf to the northward, until after the 500 fathom line has been passed, but it is not noticeable along the 700 fathom line. South-east of the present end of the delta the 1000 fathom contour approaches the coast in the form of a broad embayment, which may represent a continuation of that belonging to the cretaceous seas, which eventually became filled. The soundings at less depths do not indicate a channel like depression extending shoreward as do those from 100 to 500 fms. to the westward, south of Barataria Bay.

OSCILLATIONS OF THE CONTINENT.—Prof. Hilgard has shown that west of the Lower Mississippi the pleistocene deposits fill a channel to a depth of 450 ft. below the gulf; therefore, the continent in the region of the gulf must have stood at least that much higher than at present during the time when the great tertiary channel was excavated. However, as shown at the New Orleans well the Port Hudson group of deposits extends more than 630 feet in depth, thus necessitating the former continental elevation to have been more than 630 ft. higher than at present. But it seems to me that the river-like channel in the gulf to the southward tends to show that the preglacial elevation when the valley was being excavated was much greater, even if not 500 fms. or 3000 ft., as indicated by the soundings in the gulf. Pot-holes at the mouth of the Susquehanna, Hudson, and Saguenay (in the St. Lawrence) rivers show that the continent on the east coast was formerly at least 1000 or 1200 feet higher than at present at the time when the rivers excavated their deep channels, of which only fragments have not been obscured by modern sediments. After the excavation of the valleys the continent was again submerged not only to 450 ft. (as indicated by the elevation of the earlier post-pliocene deposits of the south) but to 1000 or 1200 ft., as shown by the yellow loam of the south.

CHARACTER OF THE CHANNEL DEPOSITS BETWEEN THE GULF AND THE MOUTH OF THE OHIO.—Much valuable information has been collected by Major Suter, Mr. Wilson, Mr. Nier, and others from more than 80 borings through the alluvial bottoms of the river between New Madrid, Mo., and Lake Providence, La., a direct distance of nearly 300 miles, or about double that distance, measured along the sinuosities of the modern river. A large number of these borings enter the lignitic clays, which Mr. Wilson identifies as those of the northern lignitic group (eocene) of Hilgard. Nearly all the borings reached eocene deposits which contain no gravel, as do the alluvial and older quaternary sediments. However, there is some difficulty in always distinguishing between the alluvial and older orange sand deposits obtained from borings, which consist of clay, sand, and gravel, all highly siliceous. The great diversity of deposits in adjacent borings is naturally explained by Mr. Wilson, on the ground that they were made along different sections of the old shore lines of a sinuous channel. A large number of borings were made in the same localities, and from some of their records Mr. Wilson has prepared a table of the depths of the alluvium referred to high-water mark, all the borings having reached the lignitic clays (eocene). In the region of New Madrid the alluvium reaches depths of 91, 107, 118, and 200 feet; adjacent to Plum Point (near Osceola) it is 111, 119, 150, 165, and 192 ft. deep; near Memphis, 149 ft.; at Helena, 163 ft.; along Choctaw Bar (above Gaines' Landing), 102, 106, 112, and 125 ft.; at Greenville, 88 ft.; adjacent to Lake Providence, 111, 125, and 131 ft. It is not known that the deepest sections of the alluvial deposits have been found; but it is noteworthy that the depth is greater to the northward than the southward. This would indicate that the declivity of the bottom of the old channel is less than that of the modern valley. Whether the deposits which Mr. Wilson considers alluvium be such, or whether they may include the orange sand or its equivalent, it matters but little to this study, which refers to the original development of the channel rather than to the re-excavation since the earlier pleistocene epoch.

STEEL "CROWN" BRAKE-WHEELS.



The wheel represented in the above illustration is of a simple but novel design. Owing to their superior form they are made surprisingly light, consistent with strength and durability, proving themselves wherever adopted a great saving to animal and steam power. These wheels have been in use for a long time past on contractors' wagons, corves or tubs, and trolleys for colliery and mining uses. They are made by Messrs. HANSELL and Co., of Sheffield, of a brand of metal for which they have become celebrated, and which, by way of distinction, they designate special crucible steel. Their experience of over 30 years has given them much valued knowledge, and although the present design of wheel has been practically proved good the many difficulties met with in endeavouring to produce thoroughly reliable tough and sound steel castings have for years past engaged the attention of well-learned metallurgists and practical manufacturers. At the onset it perhaps appears to the non-technical reader a simple thing to turn out satisfactory castings in steel, but in no business is it more necessary that long practical experience should be possessed, for the amateur will burn his fingers. These improved steel wheels, which Hansell and Co. projected some time ago, have their arms or spokes radiating in different directions, as shown by the illustration, so that it is impossible to cause fracture by sudden spragging or the application of the brake, for no matter in which direction the wheels are travelling, whether from right to left or from left to right, the tyre and boss are thoroughly supported. Curved arms are not liked by some users, who say that the spagg becomes fastened. There is no necessity to adopt right and left wheels when ordinary curved arms are adopted, and it will be seen at once that this design overcomes a host of former objections. In larger diameters it is more noticeable that these wheels possess a very important feature of not being affected in wear during frosty weather. The influence of contraction is exerted equally, and there are no unproportionate parts to be weakened by tension. Straight armed wheels, as is well known, are liable to fracture, and are most difficult to cast in steel. As an instance, although Hansell's special crucible steel, of which these wheels are made, contracts ¼ inch per foot this design of wheel may be taken from the mould immediately after casting, while white hot, and allowed to cool even in frosty air, and in this condition they will resist severe blows from a sledge hammer without fear of cracking. It is stated that these wheels are not more difficult to make than the ordinary design of steel wheels, and Messrs. Hansell and Co., having an extensive stock of wheel patterns of all diameters, can adopt this design to suit any application, hence it will be apparent even to the most inexperienced how much better these improved steel wheels must be for resisting strains and constant wear and tear.

Messrs. Hansell and Co. have long devoted their attention to specialities in steel, and have had a long practical experience, their predecessors having formerly carried on the same business at one of the first works established in this country after the introduction of the manufacture of steel castings from the Bochum Works, of Germany, and they have some really labour-saving appliances to which reference may at some other time be made.

IRON AND STEEL INSTITUTE.

The Institute continues to make satisfactory progress. There has been an increase of 254*l.* in the income, and the expenditure has been 234*l.* less. At the annual spring meeting in the theatre of the Institution of Civil Engineers, on Wednesday, the report showed that 131 names had been added, and 68 removed from the list of members, and the 63 candidates for election at the present meeting increased the membership to 1332. The Middlesborough meeting last year had turned out one of the most numerously attended which the Institute had yet held, upwards of 400 members and 100 visitors having been present, including several metallurgists of eminence from broad. The lamentable accident at the North-Eastern Steelworks, Middlesborough, by which Mr. Davidson lost his life, had induced the Council to make an appeal to the members on behalf of his widow and family, and in response a sum of 1450*l.* had been subscribed. Mr. Whitewell, treasurer to the Davidson fund, said the trustees were Mr. William Davidson, brother of the deceased, and Mr. Williams, a brother-in-law. It was thought desirable to give the trustees great latitude in the distribution of the fund. The report was adopted.

The Bessemer gold medals for 1884 were presented to Mr. E. P. Martin, general manager of the Dowlais Ironworks, and Mr. Windsor Richards, Middlesborough. The PRESIDENT, in making the presentation, said the medals were given to those two gentlemen as they had been the means of carrying into effect the discoveries of Mr. Snelus and Mr. Thomas, as a means of utilising, in the manufacture of steel and homogeneous metal of a high-class, crude irons contaminated with phosphorus and other impurities. But for them the discoveries of those gentlemen might long have lingered in obscurity. It was Mr. Martin, in the first instance, who enabled Mr. Thomas to carry out his practical experiments with the basic process, and when that was done Mr. Richards stepped forward, and with a perseverance which had seldom been equalled, supplemented the efforts of Mr. Thomas by proving that the process was commercially a successful one. Mr. Martin, in acknowledging the compliment which the Institute had conferred, predicted that the basis process was still in its infancy.—Mr. WINDSOR RICHARDS, in replying, said at Messrs. Bolckow, Vaughan, and Co.'s they were now making 3000 ingots per week of five days from Cleveland iron, while they had successfully lived down the prejudice against that particular kind of steel. The credit of the basic process was due entirely to Mr. Sidney Thomas, who, he was sorry to say, was in a feeble condition of health through his exertions in carrying his invention to a successful termination. He was sure that it was the wish of every member of the Institute to see Mr. Thomas return thoroughly convalescent, so as to be able to take part in their discussions.

THE USE OF RAW COAL IN THE BLAST FURNACE

Was discussed in an interesting paper by Mr. I. LOWTHIAN BELL, F.R.S., who stated that in the various communications which had been read at the meetings of the Institute upon the consumption of fuel in the blast-furnace, coke alone had been considered as the source of heat; but in America, in 1882, no less than 2,042,138 tons of iron, or 39 per cent. of the entire make, was produced by means of anthracite coal. The hardness and density of American anthracite were such that the produce of the mine required to be dealt with in a peculiar fashion. The coal as it reached the surface, had the largest blocks separated from the remainder, and it was those alone which were taken for the blast-furnace use. If they measured the value of bituminous coal and coke in the smelting of iron in a calorific point of view, when both were fully oxidised there was but little difference between them. There was no more ammonia and tar obtained from a ton of coal distilled by Sir J. W. Pease and Co., in the Simon-Carvès oven than was obtained from the Scotch splint coal used by Messrs. Baird in the blast-furnace. Having regard to what had actually been achieved, we had more than 12,000,000 tons of coal used by our blast-furnaces alone, and probably capable of yielding substances worth, at present value, nearly two millions sterling per annum. At the conclusion of his paper Mr. Bell mentioned that he had a letter in his possession from the Messrs. Baird, in Scotland stating that they were getting 30*l.* per ton for the sulphate of ammonia derived from the coal used for smelting purposes.—A most interesting discussion followed as to the value of raw coal for smelting purposes as compared with coke, which led the President to remark that in future, instead of endeavouring to economise fuel, it might be desirable to increase the consumption in the manufacture of iron. Some gentlemen had rejoiced that they had been able to get rid of the tar by volatilisation, but if the bye-products could be made to produce 18s. per ton of coal, there would be no necessity to economise fuel for smelting purposes.

THE CASSON-BICHEROUX SYSTEM

An improved gas puddling and heating furnace, with special reference to the Casson-Bicheroux system, was described by Mr. R. Smith-Casson, who explained that a reliable gas-heating furnace of the Casson-Bicheroux type could be produced for 250*l.*, as compared with 490*l.* for a Siemens furnace. It also avoided the necessity of a costly and troublesome regenerator, whilst enabling the waste gases to be utilised for raising steam or other purposes. The coal in some of the most important iron and steel making districts was of too bituminous a nature to be successfully applied in gas producers of the present type; but whilst that applied in a greater or lesser degree to the Middlesborough district, it had no application to Staffordshire, Shropshire, Yorkshire, Derbyshire, or Scotland.

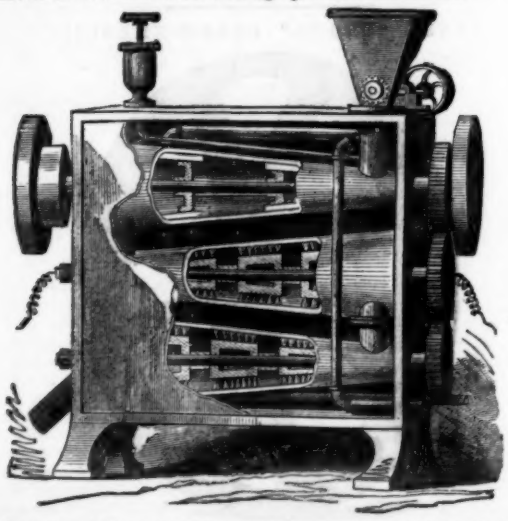
UTILISATION OF GASEOUS FUEL.

The most recent results obtained in the application and utilisation of gaseous fuel were recorded in a paper by Mr. W. S. SUTHERLAND, in which the author described the means adopted by Messrs. William Baird and Co., at Gartsherrie, for the recovery of bye-products from their blast-furnace gases. He expressed the opinion that the time was not far distant when tar or paraffin oil would be the fuel used on steamships, whereby only about one-half the present space, or even less, would be taken from cargo room. There would also be an enormous saving in the labour of stoking, and an absence of smoke. It was a fallacy to suppose that the condenser formed the bulk of the cost of the plant. On the contrary, it was not more than 25 to 30 per cent. of the cost; whilst the extra tar and ammonia produced was sufficient not merely to pay for this when taken in conjunction with the necessity of drying the gas to get good heating power out of it, but to pay as well for the whole of the plant put down. It ought to be recollected that in the blast-furnace practice as well as in gas-producers, the use of the gases for heating stoves and boilers, and for evaporating, was of far too great importance to be neglected. So far from the elimination of the tar and the cooling of the gases interfering with their heating power, it was found at Gartsherrie that in this way a less amount of gas was used even than before.

NOVEL ELECTRO METALLURGICAL MACHINE.

PROFESSOR JAMES MANES AND SONS call the attention of miners, mineowners, capitalists, and others interested in the working of gold or silver mines to their new Electro Metallurgical Machine for extracting fine and rusty gold from sands or tailings of stamp mills, or the sands of hydraulic gold diggings, or from the black sands on the coast of Oregon or California, and other parts of the world where gold is found.

The problem that has long troubled the worker of free-milling gold and silver ores is a method to save the mineral now lost in the tailings of stamp mills or flumes. This alone, if it could be saved, would amount to many million dollars profit each year, besides enabling the working of much territory which is now lying idle for want of an economical and thorough process of treatment.



Prof. James Manes and Sons, of Denver, Colorado, U.S., have invented a machine (represented in the above engraving) which it is claimed will save nearly the entire amount of mineral which passes through it, the loss not being over 10 per cent., and in many cases not in excess of half that amount. The machine is a cheap and practical process—it never need stop for charging or cleaning up, being nearly self-acting. Steam, electricity, and mercury are used in the process of extracting the mineral.

This machine or amalgamator is adapted for free-milling gold or silver ores, or refractory after roasting. It consists of a series of three or more large cylinders, wider at one end than the other, placed one above the other in a horizontal position, a shaft or spindle running through the centre of each.

The ore and mercury are fed into the first cylinder, passing into the second, and then to the third. The first cylinder is furnished with steel mullers which nearly touch the sides of the cylinder, and revolve at a good rate of speed, mixing the mercury and ore. The second cylinder is furnished with large steel brushes attached to the shaft or spindle, revolving at a high rate of speed; through this a current of electricity is furnished by a Westinghouse dynamic electro machine, which materially assists in gathering the particles of very fine gold together, and thoroughly amalgamating the metal and mercury. The third cylinder is similarly furnished to the second; into this the amalgam passes, and is again acted upon and mixed by the brushes to catch any gold which might have escaped amalgamation in the second. A fourth cylinder may be used if found necessary.

The amalgamated pulp then passes through a revolving copper drum, plated with quicksilver inside. As the drum revolves it takes up the most part of the amalgamated gold. As the inside of the drum is constantly washed with a spray of water from perforated pipes fixed inside of said drum, a clean-plated surface is constantly brought in contact with the pulp or tailings as it passes out from the cylinders. After leaving the drum it falls down on to incline copper plates, the same as is now used in stamp mills.

The amalgam can be collected from the drum and plates without stopping the machine, and any live quicksilver that passes will be caught in syphons. The tailings are carried off with the water. The machine when attached to the flume will be driven by the waste water; it sifts the fine sands from the coarse gravel, and amalgamates it as above.

The specific points claimed by Prof. Manes and Sons in their patent are—

1.—The saving of almost all the mineral passing through the machine.

2.—The loss being less than 10 per cent.

3.—The entire absence of loss of the amalgamated material, thereby saving all the mercury, which, with the processes now in use, there is a large loss both of mercury and the precious metal.

4.—The small cost per ton at which the ore can be treated.

By the addition of the powerful current of electricity that passes off the revolving brushes, the most minute particles of gold will be caught and retained, which in the ordinary flume and stamps passes off with the water; this often amounts to a large percentage.

The inventors state that if English stock companies will give their assistance to work the black sands of Oregon and California by paying for the building of the machines, they will take a share of the gold for their services, or they will send their machines to any part of the world, or will sell patent rights to those desiring any of their patent machines or revolving furnaces for roasting or smelting ores, ball pulverisers, &c.

Prof. James Manes and Sons are agents for the Morey and Sparey Ball Pulveriser, that crushes and pulverises at the same time, and does as much work as eight stamps in a day, crushing either wet or dry.

PRINCIPAL OFFICE OF

Prof. MANES and SONS,

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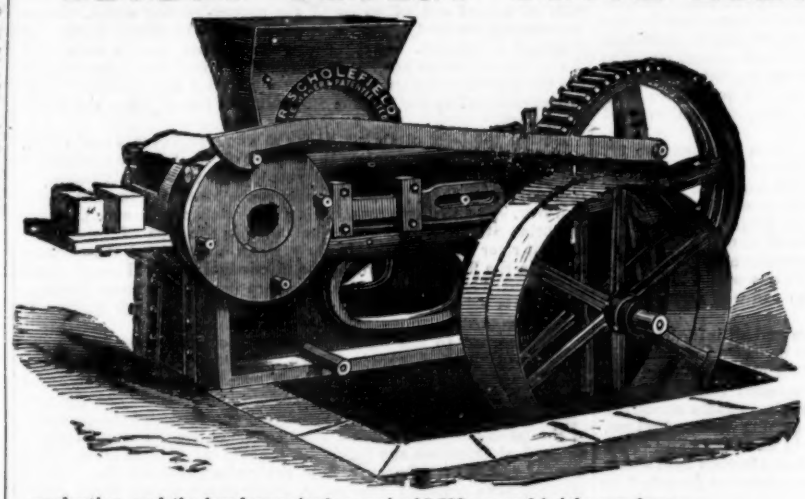
All our machines and furnaces are made by the Colorado Iron Company of Denver, Colorado, the most extensive mining machine works in America.

R. SCHOLEFIELD'S LATEST PATENT BRICK-MAKING MACHINE.



R. S. begs to call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pits during the process of coal-getting, which, instead of storing at the pit's mouth (and making acres of valuable land useless) is at once made into bricks at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, The following is about the cost of production, and the hands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	£0	8	0
1 man grinding, 4s. 6d. per day	0	4	0
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	0	2	0
1 boy greasing, 1s. 6d. per day	0	1	6
1 engine-man, 5s. per day	0	5	0
1 man wheeling bricks from machine to kiln, 4s. per day	0	4	0
Total cost of making 10,000 pressed bricks	£1	5	0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.

As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.

SCHOLEFIELD'S ENGINEERING & PATENT BRICK MACHINE WORKS. KIRKSTAL ROAD, LEEDS.

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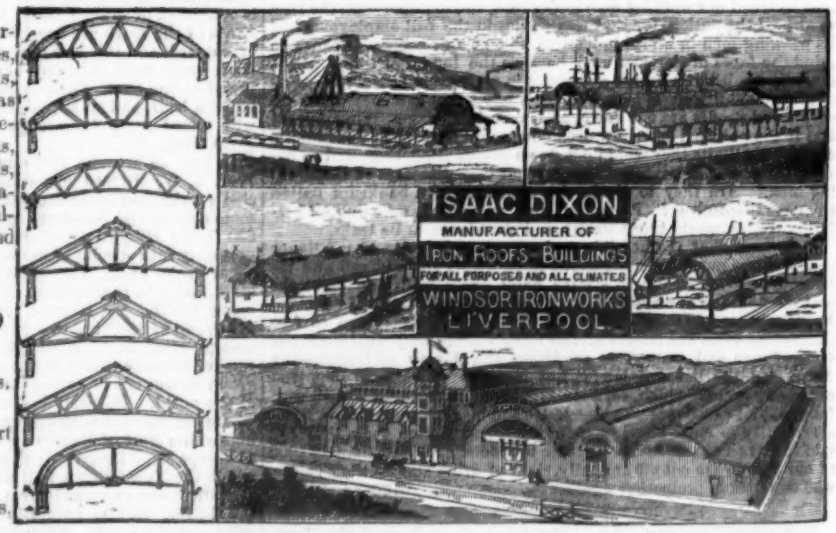

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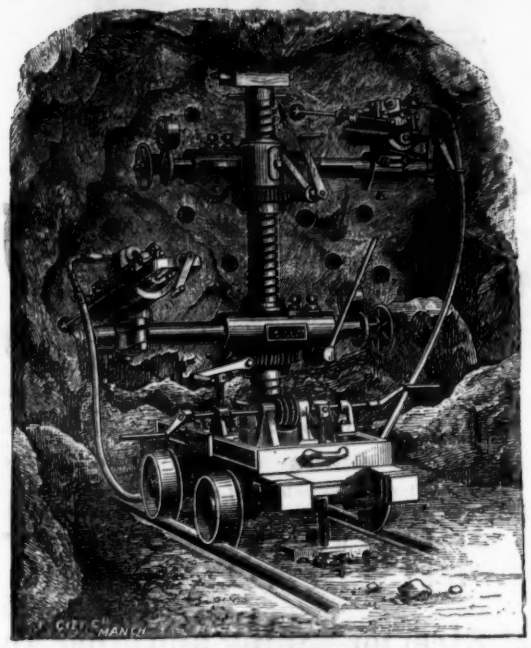

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The above refers to one of our 16 by 9 Machines we supplied to replace an "Improved Blake" 15 by 9 Machine. Several of which have already been replaced by Baxter's.

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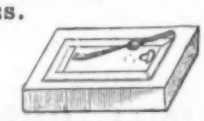

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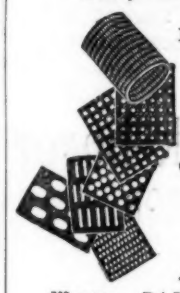

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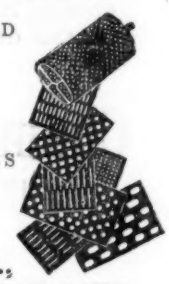

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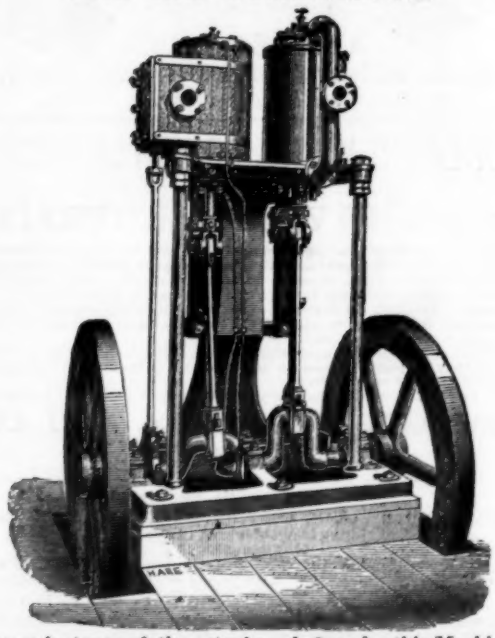

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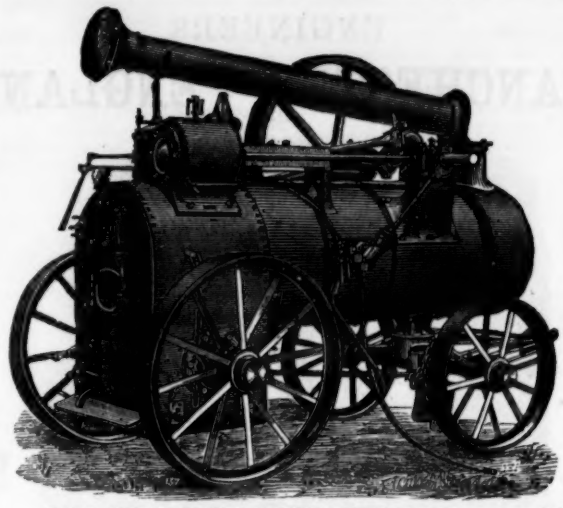

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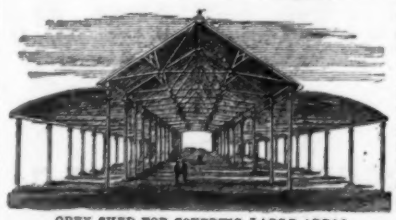

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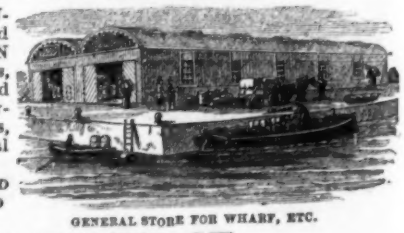

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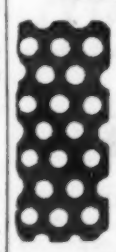

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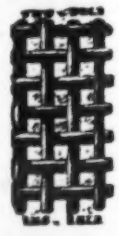

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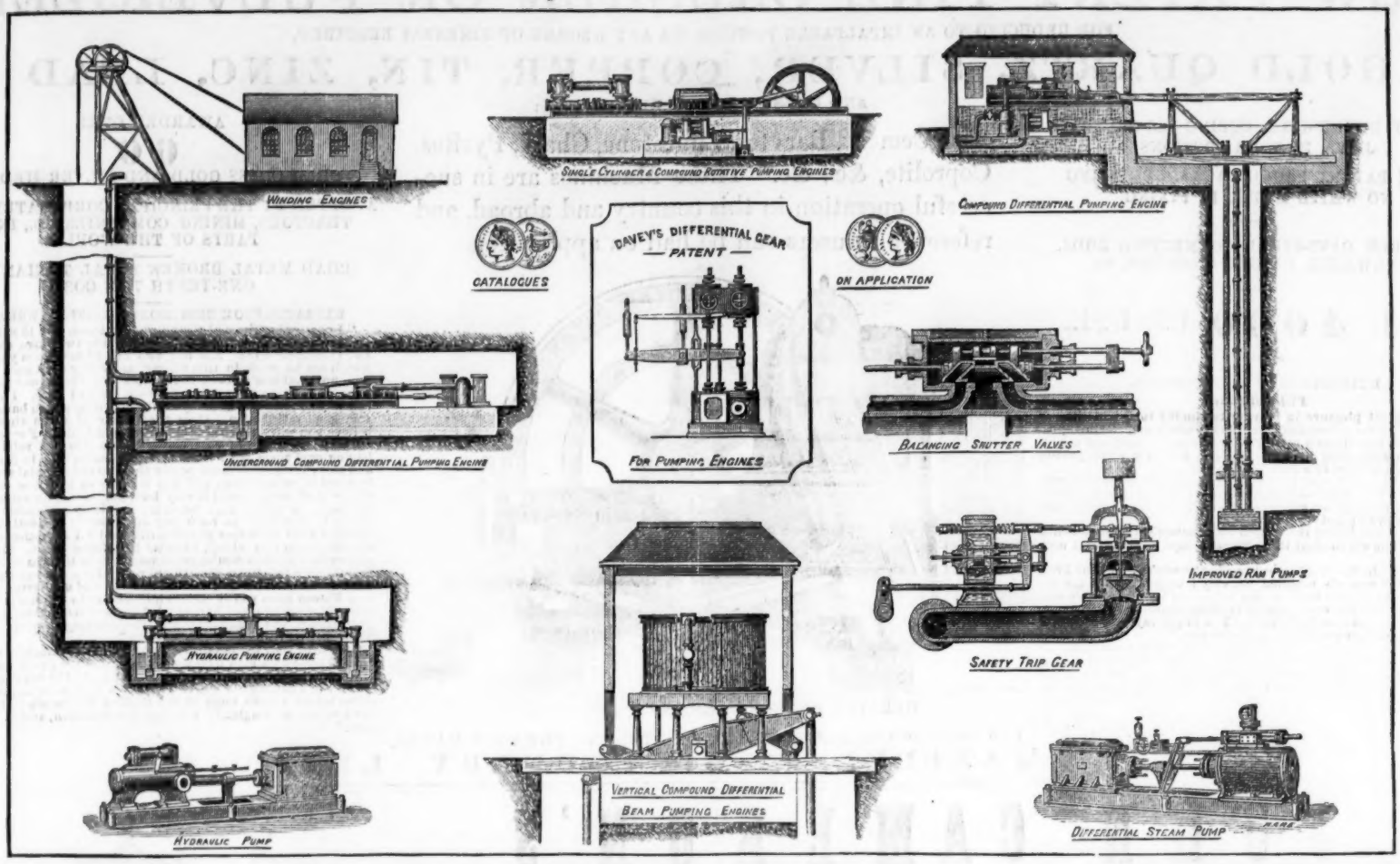

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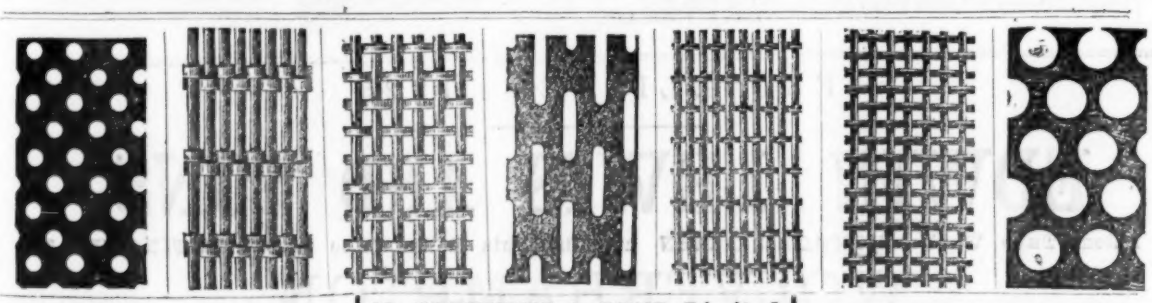

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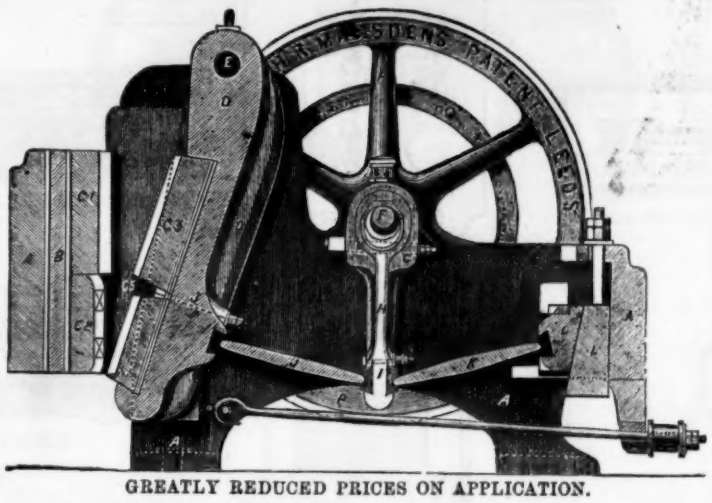

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"Our experience is that the motion and mechanical arrangements of your machine are the best for pulverizing that we have ever met with."

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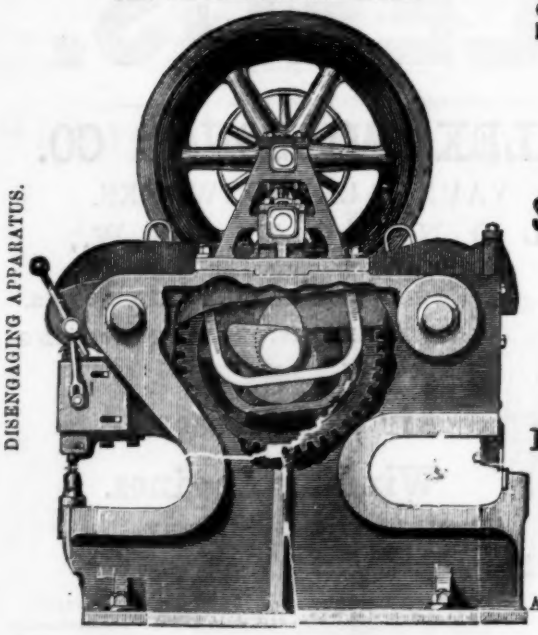

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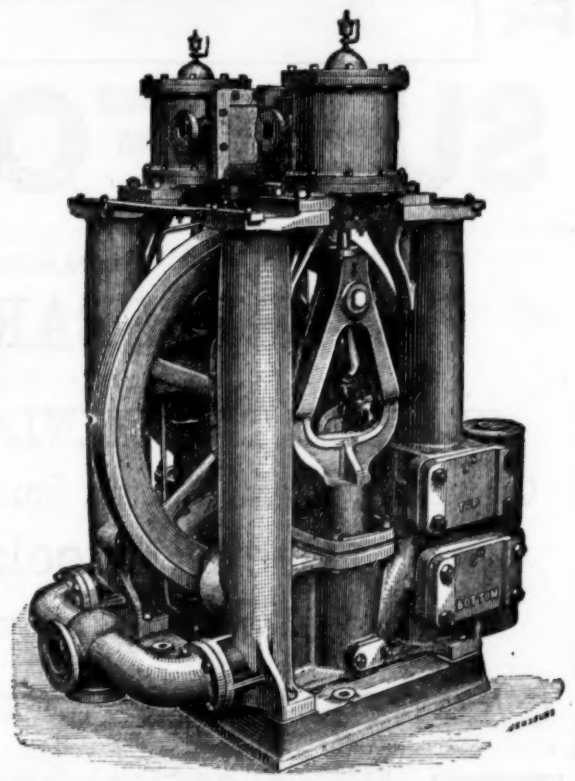

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